THE RUBBER AGE AND TIRE NEWS

JULY 25, 1920 VOL. VII. NO. 8

Member of the Associated Business Papers, Inc.

INDEX TO CONTENTS

Removing Combined Sulphur from Vulcanized Rubber 327
The German Tire Market 328
The Rubber Industry in Sumatra and Malaya 329
The Utilization of Rubber Bark Shavings 330
Electric Drive for Rubber Machinery 331
The Rubber Stress-Strain Curve 332
New United States Financing 335
Fisk Opens Oakland Warehouse 335
Wildman Purchases Biltwell Tire 335
Western States Tire in California 338
Sixth Exposition of Chemical Industries 338
Rubber Association to Hold Outing 339
Gutta Percha from the Phillipines 339
Malay Rubber Output Increases 340
Outing of the Mid-West Rubber Manufacturers Association 340
Goodyear Rubber in Los Angeles 340
Rubber Show in San Francisco 340
MARKETS:
Manufactured Rubber Goods 341
Cottons, Yarns and Fabrics 341
Chemicals and Compounding Materials 342
Crude Rubber 343
Scrap Rubber 343
Growth of the Rubber Industry 344
Rubber Imports for June 344
Rubber Exports for May 344

THE GARDNER, MOFFAT COMPANY, Inc., *Publishers*
HIGHLAND, N. Y.
HARTFORD BUILDING, UNION SQUARE, 22 EAST SEVENTEENTH STREET, NEW YORK

SUBSCRIPTION PRICE: TWO DOLLARS PER YEAR. SINGLE COPIES TEN CENTS. CANADA, TWO AND A HALF DOLLARS PER YEAR. FOREIGN, THREE DOLLARS A YEAR.

COPYRIGHT 1920, BY THE GARDNER, MOFFAT COMPANY, INC.
ISSUED ON THE 10TH AND 25TH OF EACH MONTH. FORMS CLOSE FIVE DAYS PREVIOUSLY. ENTERED AS SECOND-CLASS MATTER JUNE 10, 1920, AT THE POST OFFICE AT HIGHLAND, N. Y., UNDER THE ACT OF MARCH 3, 1879.

TRENTON N.J., U.S.A. **ESSEX RUBBER COMPANY, Inc.** TRENTON N.J., U.S.A.

"ERCO" SOLES
"ESSEX" RUBBER HEELS
"TITE-EDGE" RUBBER HEELS

MOLDED SPECIALTIES

Trade Mark

AUTOMOBILE ACCESSORIES

INNER TUBES, CEMENTS, ETC.

MOLDED RUBBER GOODS

COMPRESSED AND LIGHT
CARBON BLACK

1890 L.H.B.CO.

CARBONATE AND OXIDE
MAGNESIA

L. H. **BUTCHER** CO., Inc.
ESTABLISHED AT SAN FRANCISCO 1890

NEW YORK SAN FRANCISCO LOS ANGELES SEATTLE AKRON

AKRON ADVERTISING AGENCY

A Basis for Selecting Your Advertising Agency

IN employing a factory superintendent every rubber company considers experience *in that particular work* a prime requisite.

THE same sound logic should apply in the selection of an advertising agency.

MEMBERS of our *Automotive Division* have had years of experience in serving many of the largest and most successful rubber companies.

IT is this feature of our organization that makes our service particularly valuable to manufacturers of rubber products.

We are Now in Position to Serve a Few Additional Accounts

The Akron Advertising Agency Company

SUITES 212 *to* 222
Central Savings & Trust Building
Akron, Ohio

"Our Business is to Increase Yours"

L. D. GARDNER
PRESIDENT
W. D. MOFFAT
VICE-PRESIDENT
W. I. SEAMAN
TREASURER

THE
RUBBER AGE
AND TIRE NEWS

G. M. SANGSTER, Jr.
MANAGING EDITOR
PETER P. PINTO
BUSINESS MANAGER
H. M. WILLIAMS
GENERAL MANAGER

Vol. VII JULY 25, 1920 No. 8

Removing Combined Sulphur From Vulcanized Rubber

By D. Repony

Although regenerated rubber is used extensively in rubber compounding, still the reclaimed product of today is not of the desired quality.

In considering the numerous patents issued for processes on reclaimed rubber, it is evident that a great number of rubber chemists apparently follow the right track by endeavoring to remove the combined sulphur, expecting that when they are able to remove this without destroying the molecular structure of the rubber they will obtain a product which is similar to the raw rubber. Whether removing the combined sulphur from vulcanized rubber will result in the obtaining of a product which is similar to raw rubber is a question which cannot be answered at the present time.

Different Viewpoints Necessary

In considering the probability or the improbability of obtaining raw rubber from the vulcanized product, we must consult different points of view and upon analyzing all the theoretical suppositions we arrive from the examples to the conclusion, which alternately speaks for and against the possibility of obtaining raw rubber from the vulcanized product.

For example—we can never expect to obtain from worn out clothes a wool equal in quality to the original material, or to be able to obtain from bread the same flour from which the bread was originally made. However, as glue can be recovered a number of times without losing its original properties, the thought arises that the same thing can be accomplished with rubber as it is also a colloid. Yet this only applies to unvulcanized rubber, and even then only to such rubber as has not been oxidized. Vulcanized rubber is a completely different substance from unvulcanized rubber, and therefore so far as recovery is considered, it cannot be compared with other colloids such as glue or celluloid.

Further, we must consider the fact that vulcanized rubber scrap is not only combined with sulphur, but also contains oxygen in a chemical combination, which has been absorbed during the life of the rubber article while in contact with air, light, and heat. However, this would not be a sufficient hinderance, because if anyone is able to remove the combined sulphur without destroying the molecular structure of rubber, he will also be able to remove the oxygen.

Erroneous Conclusions Assumed

Of the great number of patents for reclaiming rubber, the majority claim that the patented treatment removes the combined sulphur, while in fact this is not at all the case.

It is a difficult matter to affect vulcanized rubber in solution and anyone who has not had sufficient experience in this field may be led to believe that the combined sulphur has been removed when the vulcanized rubber was brought into solution. Further, the wrong supposition is possible in such cases, when the vulcanized rubber solution is treated with some reagent which has the power to combine with sulphur, because in all such cases the reagent combines with the free sulphur, and the latter is liable to be mistaken for removed combined sulphur.

However, the most confusion and also the greatest number of such patented processes are possessed by men who do not know much about rubber, and so it is no wonder that these men believe that any plastic mass which has the appearance of reclaimed product is equal in properties to raw rubber.

Removing Sulphur Destroys Molecular Structure

It is not the intention of the writer to criticize in detail the value or worthlessness of the patented process, but it remains a fact that up to the present it has not been possible by any known process to remove the combined sulphur without destroying the molecular structure of the rubber. As a matter of fact, nothing will be lost to the experimenter or to the concern employing him if the valueless experiments he has performed are published as this would eventually save many others from repeating the same experiments and thus result in a saving in both time and expense.

The various experiments are written in the order in which they were performed.

Vulcanized rubber passes in solution on boiling with kerosene, etherical camphor oil, practically in all fatty oils, liquid tar, nitrobenzol, turpentine, salol, etc., etc. In all cases heating of the solvent is required, that is, the factor of obtaining vulcanized rubber in solution, lies more in the degree of the heat than the particular solvent employed.

Under the temperature 130° C. solution is very slowly obtained, at the temperature 180 to 200° it is readily obtained while heat around 210° C. partially decomposes the rubber and the decomposition is more readily effected as the temperature increases.

Solution Most Suitable for Experiments

When vulcanized rubber, is brought into solution provided the temperature is not high enough to decompose the rubber, the latter is not affected, and the combined sulphur remains united with the rubber. Although the solution of vulcanized rubber seems to be the most suitable for the experiments nevertheless some experiments have been performed on ordinary dry reclaimed rubber. All the experiments have been carried out with the intention of finding some reagent which has greater affinity for sulphur than has the rubber.

Common reclaimed rubber intermixed with powdered caustic soda, and moistened with a small quantity of water has been subject to autoclave to 160° C. and six hours later this treatment the product was washed thoroughly with water and analyzed, but not the slightest portion of the combined sulphur had been removed.

Similar experiments have been repeated by employing lead fllings, lead acetate, iron fllings, iron acetate as reagents, but not better result was obtained.

Acting on the assumption that any reaction will take place more readily while the rubber is in the solution than

in the solid state, the following experiments were carried out:

Vulcanized rubber (tire treads) were broken down to smaller pieces and brought into solution with linseed oil at a temperature of 180° C. This solution while hot was poured in boiling 30 per cent caustic soda, and boiled till the linseed oil became saponified, and the rubber completely reprecipitated. At the conclusion of this reaction none of the combined sulphur was removed, and the rubber obtained had the appearance of the ordinary shoddy.

Knowing that liquid tar has a great affinity for sulphur, that is, the sulphur, becomes readily combined with the unsaturated molecules of hydrogen, forming H_2S the following experiments were performed.

Ground vulcanized rubber was immersed in liquid tar and exposed in autoclave to 150° C. temperature, after eight hours digestion a product similar to heavy rubber cement was obtained. This rubber was then treated with a mixture of benzol and alcohol to effect the separation of the rubber. The refined product was analyzed and proved to contain all the combined sulphur originally present.

Experiments with Nascent Hydrogen

Since nascent hydrogen has great power to decompose sulphides, advantage was taken of this reaction.

Vulcanized rubber was brought into a solution with kerosene, mixed with zinc dust, dilute hydrochloric acid was added, and after stirring and boiling this mixture a large amount of H_2S was evolved.

When this experiment was repeated on rubber free from sulphur and sulphides, the same reaction took place, after the reaction ceased, the kerosene was extracted with acetone. The product obtained upon analysis proved that some of the combined sulphur had been removed, and that chlorine was substituted in its place. At the same time the structure of the rubber was changed so that the resulting product had jelly-like properties. It was impossible to vulcanize it again with sulphur or to make it assume the well-known properties of vulcanized rubber by any other means.

This experiment was repeated by taking dilute sulphuric acid instead of diluted hydrochloric acid, but no hydrogen sulphide was formed nor was the rubber changed in any particular. In using a solution of oxalic acid, the result was the same as when diluted sulphuric acid was used. Again dilute acetic was used and in another case very dilute nitric acid. In both cases, however, the rubber oxidized to a powdery substance, and none of the combined sulphur was removed.

Further Experiments

Other experiments with nascent hydrogen were tried obtaining the latter by basic reaction instead of by acid reaction:

Aluminum dust was mixed with high grade reclaimed rubber, and rolled out to very thin sheets, the latter immersed in boiling 30 per cent NaOH solution. Reaction took place vigorously, but upon analysis it proved that none of the combined sulphur had been removed. No better results were obtained by using zinc dust instead of aluminum dust nor by using sodium oxalate.

Eight pounds of high grade reclaimed rubber were mixed with one pound of metallic sodium and the mixture became very hot during mixing. Of course, the heating was due to the rapid absorption of moisture from the atmosphere, and yet before I was able to mix thoroughly the mixture took fire. Fortunately, however, the largest portion was plunged at the right time into boiling water, so that the reaction took place vigorously. However, this product upon analysis also proved that no combined sulphur had been removed.

From the foregoing experiments it is evident that the problem of removing the combined sulphur without destroying the molecular structure of the rubber is extremely difficult, and will require much systematic study before the right process for its solution can be obtained.

Among all the experiments herein described, the reaction of nascent hydrogen developed from zinc dust and dilute hydrochloric acid, in which chlorine was substituted for the combined sulphur is the most interesting one and may serve as a basis for further research in this difficult problem.

The German Tire Market

There is a decided shortage of tires in Germany and all statements by German tire manufacturers as to their ability to cope with the demand are declared to be mere bluff by wholesalers and agents who are loud in their complaints about the insufficient supplies by home manufacturers. They point out that only a short while ago the Rubber Syndicate virtually acknowledged its inability to furnish consumers with an urgently required quantity of solid tires—estimated at about 20,000—to satisfy immediate demands with the result that negotiations were opened with the Government with a view to granting an import license for a limited quantity.

Readers will probably recall that in December, 1919, a governmental decree was promulgated laying down certain rules and regulations covering export and import and vesting the existing Foreign Trade Control Boards with far-reaching power. The chief function of these Boards—self-governing bodies set up by the different industrial groups under the supervision of Government commissioners—consisted in deciding upon applications for export and import permits, fixing minimum export prices, stipulating certain forms of payment, etc. A special board was established for the rubber and tire industries composed of manufacturers and worker delegates to control the import of crude rubber and finished goods. With wholesalers and agents having practically no voice in the proceedings it goes without saying that members of the board representing the interests of inland tire manufacturers tried their utmost to veto any granting of import permits, getting the necessary support from the men's representatives by frightening the latter with the prospects of unemployment which, they declared, was sure to follow in the wake once the import of tires was permitted.

Confiscation Threatened

To make things worse a law was put into force on April 17 rendering trade in tires imported without a permit after date of February 6 illegal and threatening owners of such tires with confiscation. Wholesalers or agents in possession of such stocks—most of which found their way into Germany through the occupied territory on the West until the Interallied Rhineland Commission acceded to the request of the Government to reestablish the custom control—are accordingly in a bad fix, believing as they did that in paying import duty and luxury tax on the imported goods they acted in a bona fide way though it remains to be seen whether the new law will be carried out to the letter.

The situation thus threatening to gravely imperil the position of the middlemen, a tire merchants association was founded in April by leading wholesale firms and dealers with a view of protecting their interests. A definite program was drawn up at the general meeting held on May 7 at Berlin. Nearly 130 firms were represented and a resolution was passed protesting emphatically against the new law under which stocks purchased months ago without import license were liable to seizure, and urging a revision of the present import restrictions.

American tire importers will be well advised to watch the German market and though there may be little chance for closing deals under the above mentioned circumstances at the present moment, they should not lose time in getting into touch with reliable firms in order to be prepared once the import restrictions are revised. With the recent improvement in the German exchange, prices should no longer form an obstacle and American tires are very popular in Germany. In fact, one of the leading dealers declared that, prices being equal, American tires were fifty per cent better than German makes doubtlessly due to the fact that raw materials of first rate quality only are used in the manufacture. American tires of standard size were offered to German firms at from $26 to $30 while German makes of the same quality cannot be had for less than 3000 marks—a fact largely due to the high cost or raw materials and the steady increase in wages.

In conclusion, American exporters will do well to ascertain whether German importers are in possession of an import license before closing deals as it may cause them a lot of trouble in case the goods are held up by the customs officials.

The Rubber Industry in Sumatra and Malaya

By C. D. Rockwood

Purchasing Agent, Mason Tire and Rubber Co., Kent, Ohio

As a preface to this article I wish to state that for the past year or eighteen months there has been an almost unprecedented expanison in the rubber industry in both Sumatra and Malaya, which results in our finding ourselves confronted with a condition of extremely high prices for undeveloped as well as developed rubber land.

During the past ten years there has been a continuous expansion of the rubber growing industry. It is the opinion of many that we are nearing the peak, if not already there, and with the present market depreciation in rubber (mid-April, 1920) the situation presented is rather an anomalous one.

There have been, however, two distinct setbacks to the planting game. The one shortly before the war and the other immediately after the Germans declared unrestricted warfare. During these two periods the planters were very uneasy and at a loss to know just what course to pursue, as a result of which many plantations were thrown on the market and undeveloped land in large areas was quite easy to obtain and quite inexpensive.

It is my purpose in this article to explain as best I can from my recent personal observation of the rubber industry, the growth of the rubber, the people, their life, habits, and the peculiarities and features of the country as a whole.

Plantation Location

In determining the location of a plantation, whether developed land or virgin jungle, there are six points which may almost be said to be of equal importance, and each one must be given very careful consideration, i. e.; 1. Suitable Soil, 2. Labor Supply, 3. Rainfall, 4. Proximity to Market, 5. Transportation Facilities, 6. Cost of Land, and each of these items and sub-headings, which may be classified under them, will be taken up in the order given above and as of Sumatra and Malaya.

There are a number of types of soil which are suitable for growing rubber, but two of these types are generally conceded to be the most desirable and are as follows:

Coarse, red, sandy soil, free from loam but with small percentage of clay. This soil is commonly called red soil, and is more prevalent in Malaya than in Sumatra. Many of the planters assert that this soil produces a higher yield of latex than the gray volcanic soil of Sumatra or the dark loam which is found in the low lying lands.

Gray volcanic soil, composed of loose, coarse sand and with small clay content. This type of soil is quite prevalent in Sumatra, which is of volcanic origin. The red soil is also found in Sumatra in some sections.

Topography

Land which is of a gently rolling character but not too steep, is the most desirable, from the standpoint that such land is usually naturally drained or lends itself to artificial drainage if the elevation is satisfactory.

Where the land is too steep as on the hill sides, it is necessary to terrace and drain the soil around each tree as such areas are liable to heavy wash during the rainy season. Furthermore, as the lateral roots of the trees must have plenty of good topsoil to ensure a good yield of latex, and the steep hill sides are so continually washed by the rains, that the most uniform distribution of the best soil is found on the level or rolling land.

It is on the east coast of Sumatra and the west coast of the F. M. S. that the greatest development in rubber estates has taken place and there are still some suitable areas available in these sections although they are fast being taken up by speculators and larger rubber growers. The east coast of the F. M. S. while possessing equally good soil, has not been as popular for development owing to the fact that for practically six months of the year the ports on this coast are extremely hard to enter on account of the northeast monsoons, which cause very rough weather, also the best areas in this section are not as yet served by rail transportation. The government is at this time extending the railroad north of Kula Lipis, in Pahang, where the greatest development is now going on, to connect with a northern road which runs to Bangkok. This branch will be completed within the next three years and will open up some very desirable land.

The small islands just south of Singapore are not desirable for rubber cultivation, which is also true of the islands along the coast of Sumatra, owing to the fact that they are so low that drainage is very poor, and a very few feet under the surface of the ground water is found. The rubber tree demands immense quantities of water but will not thrive if the tap root is immersed all the time. The latex yield on many of these islands which are cultivated is extremely low per acre.

Borneo is highly recommended for rubber cultivation. However, labor conditions there are much the same as in the F. M. S. and Sumatra, i. e, a great shortage.

Labor Supply

Sumatra: Practically all the labor on the plantations in this country is by contract from Java and is supplied by an organization called the A. V. R. O. S. at the rate of 150 guilders per head ($60 U. S. currency.) The laborer supplied in this manner is required to sign a contract to stay three years and during his term of service is practically a slave, as he cannot refuse to work, unless sick, cannot quit or run away, as the government, recognizing that to the uneducated coolie a contract has no meaning whatever, has protected the planter by laws which provide for terms of imprisonment for coolies who refuse to live up to their contract.

The planter pays a stipulated wage, which at the present is 46 guilder cents per day ($ .184 U. S.) for male and 41 guilder cents per day ($ .164 U. S.) for female labor and must furnish each coolie male or female, 15 kilos (33 pounds) of rice per month at 10 guilder cents per kilo, $ .04), which is deducted from his or her wages each pay day.

Owing to the present extreme scarcity of rice and necessity of importing it from Japan and America, this shows a great loss to the estate, as the present price of rice is 75 guilder ($30.00 U. S.) per hundred kilos, (220 pounds adv.).

Scarcity of Javanese Labor

The A. V. R. O. S. is a society supported by the planters of Sumatra, although membership is not compulsory. They supply labor, rice and maintain a bureau of research along technical lines, as to pests, diseases, etc., and conduct experiments for the benefit of the rubber growing industry of the country.

It is a fact that Javanese labor is now getting very scarce and it is only a question of a very few years (3 to 5) before the Dutch government will probably be compelled to abolish the contract labor system altogether and any estates which do not have their full quota by that time will no doubt find considerable difficulty in securing sufficient help from the free, or floating labor element. There is much talk at the present time about the abolishment of contract labor and the planters are quite uneasy over the question. Scarcity of labor in Java is also hastening the discontinuance of contract labor in Sumatra.

Federated Malay States: The labor question in the F. M. S. is as bad or worse than in Sumatra, although in the state of Kedah labor is much more plentiful than in the other states, as it is practically self supporting in rice and prices for this commodity are very much lower there. This has caused a great influx of floating labor from the other parts of the country.

The laborers in the F. M. S. are either Chinese coolies or Tamels, with some Javanese. The Chinese coolies are used for the real heavy duty, such as clearing the jungle, construction, etc., whereas the Tamel is uesd for tapping and light

* From the "Mason Mail"

work. The Tamels are recruited in India and can be landed on the plantations in the F. M. S. for $45.00 U. S. They are much preferred by the English, owing to the lower wages which they are paid and they are much easier to manage than the Chinese. However, the Chinese Toukes prefer all coolie labor where possible to get it.

In any case, however, unless the clearing of the jungle, planting, weeding, and bringing into bearing is let out on contract it is necessary to import labor.

The wages in the F. M. S. are higher than in Sumatra and are constantly going up, as the Chinese was experienced in trade unions long before they were heard of in America.

The Chinese coolies wages are now $1.30 to $1.50 Straits currency, which is 65c to 75c U. S. per day and the Tamel's wages are 50c Straits per day, or 24c U. S.

As in Sumatra rice must be furnished the coolies at a price fixed by the government, which at the present is 40c Straits 19.2c U. S. per Gantang (roughly 1 gallon) and it now costs $1.06 Straits (50.8c U. S.) per Gantang.

The rainfall is nearly the same in Sumatra and the F. M. S., being 75″ to 85″ per year. Often this figure runs as high as 100″ and more, but in the main the above average is correct.

Market and Supply Center

As it is necessary to transport large quantities of raw materials, such as rice, machinery and other supplies, it is quite as important to be within a reasonable distance of a market or buying center, so that the estate have a comparatively short haul for the output of crude rubber to the distributing center.

Transportation of one crop alone to the rubber market or auction may run over 1c per pound, which if magnified by high trnasportation on raw supplies can very easily make considerable difference in the F. O. B. costs.

Transportation Facilities

The railroads of Sumatra are both private and government owned. The Delphi Spore Matchkepiij, is a private corporation and covers the east coast of the country, touching the main ports from Belawan south. In the north is a government road, connecting with the D. S. M., but it is purely a military road, and service on it is uncertain. On the D. S. M., however, very regular service is maintained and quick despatch of freight likewise as there are very few solid freight trains, most of the trains being combination freight and passengers. This road is a narrow-gauge road, as are the railroads in the F. M. S.

The F. M. S. R. R. is government owned and controlled and the service and equipment is in excellent condition. The road runs from Singapore to Penang, along the west coast and a new branch runs from Germas, in Negri Sembilan, north to Kuala Lipis in Pahang. This branch is now being extended to Kota Bharu, where connection will be made with the Siam R. R. to Bangkok, which is also under construction. This new branch of the railroad north through the central part of Pahang and Kelantan will open up some desirable new areas. The General Rubber Co. has located 50,000 acres along the line of this R. R. in Pahang and Goodyear is also locating a large track in that section.

All vehicle roadways are built and maintained by the governments of both countries and those that are completed are excellent. Of course many parts of Sumatra and the F. M. S. are as yet without through government roads, and in Pahang, the least developed of the F. M. S. there is a road practically complete, which runs from Kuala Kuantan directly across the peninsula to Port Swettenham.

Through automobile trips from Singapore to Penang are almost impossible on account of the undeveloped roads, being little more than bridle paths in places and are almost impassable.

From all of the larger centers along the west coast of the F. M. S. there are good roads running into the surrounding country.

Cost of Land

Original concessions from the government, covering virgin jungle land, vary in cost according to the location, from $2.00 to $15.00 U. S., per acre. This first cost covers largely the government survey work and fees. In addition to the first cost is a normal land tax, which in Sumatra is called Hacil-tanah and in the F. M. S. "quit rent." The organization for operation of very large estates varies from that of the smaller estates only in magnitude and the following outline may be accepted as typical of all plantations. The general manager; one assistant manager for each 500 acres; Forester; Chemist; Mandors—5 per 500 acres; Tappers (coolies) 125 per 500 acres; Pest and disease gang, 10 per 500 acres; Factory Crops, according to production, takes more men for factory making crepe than sheets. Labor gang for clearing jungles, wooding, construction and road gang work.

Housing

The staff including the general managers and managers have very pretentious homes, or bungalows as they are called, with servants quarters. It is customary where an estate is larger than 4,000 acres to have a manager for each 2,000 acres, with an assistant for each 500 acres.

Assistant managers: These men are usually bachelors and live on their division of the estate. Their bungalows is much smaller than the others, although they are very comfortable, and have servant quarters.

The coolies are housed in what are called "coolie lines" and as a rule are built around three sides of a hollow square. Each building consists of eight or nine rooms, about 9′x10′, and each room houses a coolie and his family.

In the center of the square is a recreation hall, which simply consists of a board floor, raised two or three feet from the ground, and a roof is built over the floor to protect from the elements. This place is used for a community gathering place for the coolies and their families.

A rest house is a feature of all the larger estates. They are of various styles and serve as a convenience for visitors who may have to spend the night on the estate and to supply temporary quarters for new managers, etc., until permanent places can be provided.

Rubber from Bark Shavings

A new method for the extraction of rubber from the bark shavings of rubber trees and for the utilization of such shavings, which have hitherto (except for a small percentage of crepe rubber obtained therefrom) been a waste product, is described in a recent patent.

Heretofore the method used for extracting rubber from bark shavings is one in which the bark shavings are passed through a machine known as a scrap washer, and then through a creping machine, the resulting rubber being sold as bark crepe.

According to the present invention the bark shavings(mainly consisting of latex cells) are thoroughly ground and masticated between heated rollers, preferably at a temperature of about 275 degrees F., so as to knead the rubber thoroughly with the latex cells and other barky material in a heated condition and thus convert the entire mass into a dough-like or plastic substance, the particles of rubber on and in the bark shavings being made to adhere to each other by the heat and the pressure.

This dough-like or plastic substance may be used for the manufacture of tapping cups, coagulating dishes, floor matting, etc. For this purpose it is mixed with any suitable vulcanizing agent and is then shaped or moulded into any of the articles above referred to, and then vulcanized. In some cases the mixing with a vulcanizing agent may precede the treatment by heated rollers. Instead of vulcanizing the plastic substance as above-mentioned, the inventor states it may be treated for the extraction of pure rubber, for which purpose it is passed through a scrap-washer and then through a creping machine in the known manner. By this means a larger yield of pure rubber is obtained than is possible by the processes above-mentioned for treating bark shavings.—No. 142,946, to Robert Tweedy Smith, 89, Chancery Lane, London, W.C

From *India Rubber Journal*, London, England

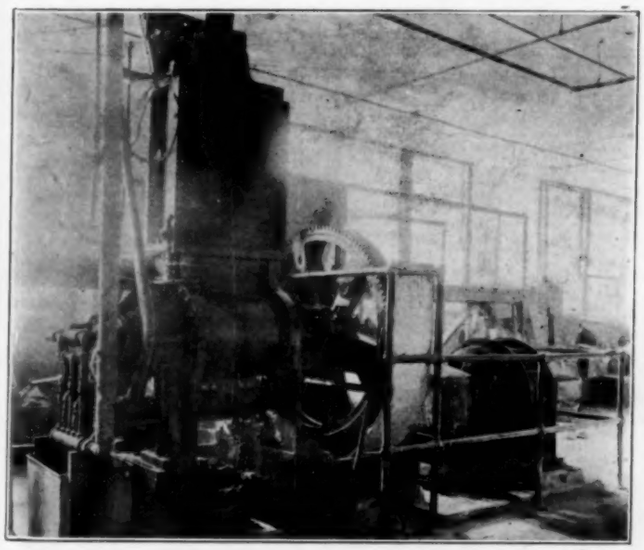
Electric Drive for Rubber Machinery

Electric drive is now successfully being applied to all the machines involved in the manufacture of rubber products in practically all branches of the rubber industry. A great saving over steam drive has been experienced due to the flexibility of control of electric motors, and their power economy. By the latter term is meant the fact that motors waste no energy when not in use, and do not require any preliminary attendance when it is desired to start them. Small mills find that electric drive is just as applicable to their needs and produces the same results as it does for large companies.

Various types of motors and various means of connections are used, although the latest accepted practice is that of gearing the motor to the machine. In the case of washers, mixers and warmers for example the machines are connected to a line shaft. In small mills where only one washer is used, it is individually driven and in such instances the motor is provided with a magnetic brake to insure instant stopping. Squirrel cage open type induction motors with moisture resisting windings have been found very satisfactory for driving these machines. Standard squirrel cage motors are also used to drive a belt driven vacuum pump for drying purposes.

Electric Drive for Mills

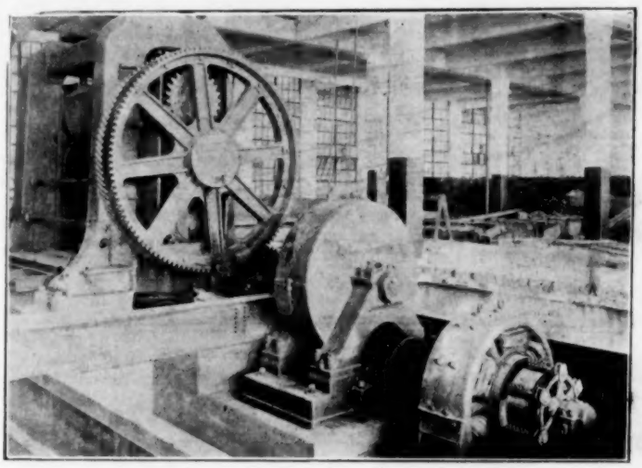
Warming and mixing mills are grouped together and geared to a shaft running along the floor. The mills run at about 22 revolutions per minute, the mill line shaft at from seventy-five to one hundred, the shaft being connected to its motor through an electrical or mechanical clutch and brake, and a set of herring bone gears. The motor is connected to the pinion shaft by a flexible coupling, which tends to relieve the motor from shocks due to heavy overloads. The clutch and brake can be operated from each mill, giving instant stoppage in case of emergency. Mill line motors are always started with the mills empty, except in cases of shut down due to failure in power. In many mills the motors are brought up to speed and the mills thrown in by means of the mill clutch. For this work either the squirrel cage induction motor or synchronous motor may be used, although the common practice is to install the wound rotor induction motor because of its better starting characteristics.



Motor Driven Mixer, Hood Rubber Co.

The most important machine in a rubber mill is the calendar which is generally used for three purposes, each having a different speed. These are frictioning, which is done at high speeds, skim coating, done at medium speeds, and sheeting, done at low speeds. Each of these operations is performed most efficiently at definite speeds, which change with the character of the compound being used, and as the rolls become heated. The speed should not fluctuate with change in the load and therefore a direct current adjustable speed motor is required for the calendar, since it gives a wide range of speed, a large number of operating points, and a close speed adjustment for maximum production.

The General Electric Company has developed a line of motors which are especially adapted for rubber calenders.



Calender and Motor, Fisk Rubber Company

The speeds standardized are the result of a careful study of the requirements of such a machine, and from investigations carried on in many of the large and small mills. The motors are mechanically strong, having large bearings, and strong shafts, and are equipped with commutating poles, insuring good commutations during overloads. Being shunt wound they give nearly constant speed with the variation of loads which occur during calendering. The motor is connected to the calender gear by a flexible coupling, and, due to the dynamic braking characteristics of a direct current motor, a mechanical or electrical clutch and brake are not necessary for safety on quick stopping. Motors are in operation driving calenders that range from 10 horsepower to 350 horsepower on both two wire, single voltage, and three wire, two voltage systems.

Calender Control

The calender control, which is semi-automatic in character consists of four parts, the main panel, master control panel, two push button stations, which are mounted, one on the front, and one on the back of the calender housing, and an emergency stop switch. The main panel carries the necessary contractors, and relays to insure proper starting, running and braking conditions. The master control switch has a large number of speed points insuring close speed adjustment and insuring exactly the right speed for obtaining the best quality of product with the maximum rate of production. The emergency switch provides a means of shutting off the power and applying dynamic braking so as to stop the motor immediately, and is operated by a rope run around the calender, so that it is available at all points. Taken as a whole the control equipment is highly flexible, reliable and furnishes excellent protection to the motors.

Besides the mixing mills, and calenders there are many other smaller machines on which motor drive may easily be used such as dust grinders, rubber strainers and fabric cutters, tube machines, tin mills, conveyor systems, elevators and hoists.

The Rubber Stress-Strain Curve*

By William B. Wiegand

Director of Manufacturing, Ames, Holden, McCready, Ltd., Montreal, Canada

To the modern University graduate in pure chemistry, rubber technology is a veritable slough of despond. In former days chemistry was taught more as a descriptive science. Nowadays it is taught as a highly deductive mathematico-physical science. Emphasis is placed on generalizations such as the Ionic Hypothesis, the Phase Rule, the Two Laws of Thermo-Dynamics, and so on. No sooner, however, has the graduate entered the ill-smelling portals of a modern mill-room than he finds himself confronted by an industry which is still an art, instead of a science. He has entered a realm where empiricism still reigns supreme.

In this, as in all technology, the rubber chemist passes through two distinct stages, the first of which we can call the test-tube stage. If, as in the case of the present writer, he is introduced to the industry through the laboratory, he begins by familiarizing himself with the customary analytical data and analytical procedures. He learns about the ash content of whiting and magnesium carbonate. He learns about the amount of free acid in sulphur. He learns to look for one-hundredth of one per cent of free calcium hydroxide in his whiting. All these tests are of interest to him, and he feels that already he is grasping the fundamentals of his industry in some sort of quantitative fashion.

The Second Stage

By and by he graduates into the factory. Possibly, as again in the writer's case, he may be consigned to the fragrant depths of the wash-room, and there made to work with hairy camp-followers of Lenine and Trotsky, until such time as he can deliver his twelve or fourteen hundred pounds of washed rubber per day along with the best of them. Next, he may move into the mill-room proper, and there his test-tube ideas receive their final quietus. He wonders why on earth he worried about the second decimal place in the ash of whiting when the mixer in charge of the huge 84-inch mill occasionally spills three or four pounds of this powder down into the shafting. Later on, when he learns something about compounding, he sees mixtures containing, for example, twenty-five pounds of whiting and one pound of hydrated lime. Then he recalls that he used to reject shipments of whiting because they contained one-fiftieth of one per cent of free lime. He notices that batches frequently contain fifty pounds of zinc oxide, and only a few pounds of sulphur, and that the amount of free acid in his sulphur, which, while in the laboratory, he used to regard as sufficient basis for rejection of whole shipments, is neutralized about a million times over by the zinc oxide or other basic ingredients in the compound as used in the factory.

As the result of these and countless similar experiences, the rubber chemist very frequently throws all of his test-tube methods to the winds, and settles down into the stride of the practical factory man, which is Stage Two—the practical or "works" stage. He learns to talk about thousands of tons of rubber, carload upon carload of this and that ingredient. The word "reclaim" or "regenerated rubber" disappears from his vocabulary in favor of the more homely "shoddy." No longer does he refer to "vulcanization." Now it is only "cure." He absorbs all the wonderful vocabularly of rubber slang. The word "catalyst" sinks to "accelerator," and so on down to "speeder." Zinc oxide becomes "zinc," sublimed white lead "lead." The word "rubber" disappears in favor of "gum." Everything around him becomes either "tacky" or "dry," and "overflow" is only "flash." I think it safe to say that 95 per cent of graduate rubber chemists have settled down into this stage of their profession. It is true they get on very well. They are able to pick up the enormous body of empirical knowledge required of the modern rubber man in a substantially shorter time than was required by the old timer. What took him twenty years they learn in as many months. They are able on demand to dig down a little deeper into the causes of things, and the black art of compounding is occasionally shot through by a faint gleam of systematic insight.

But sooner or later every rubber chemist realizes the inadequacy of this second stage of his profession. Sooner or later he is driven back to first principles. The fascinating mysteries of rubber, the perennial gamble as to the course of its life history, these lead him back inevitably in repeated, if fruitless, efforts to pierce the veil which still enshrouds the fundamental processes of our industry:—He thus reaches the third and final stage. The first stage, you will recall, was the "test-tube" stages, the second stage is the practical or "works" stage, and the third stage is once more *the test-tube stage.* By this I mean that the chemist has had driven in upon him the conviction that, after all, the minute reactions of the laboratory are the factors which really govern the enormous large scale reactions in the factory. True, he now thinks about a set of experiments entirely different from those that engrossed him during Stage One—his first test-tube stage.

Thus his originally warped ideas as to the role played by the chemical constants of his raw materials have now been straightened out and properly balanced by contact with factory practice. He ceases to worry about the free acid content in sulphur, and about the ash of his whiting. He leaves these necessary little details to one of his assistants, who is still passing through the first of the three stages, and who is glad for the training. What he now concerns himself with is questions such as this: "Why do some tires last for three years in this climate, and for only three weeks in the tropics?" "Why does Sea Island Cotton last longer in a casing than the finest of Combed Egyptian?" Why is it the devil's own job to cure litharge compounds in live steam without spotting the goods?" "By what law of thermo-dynamics does a steam hose tube stock decay under the steaming test?" "Which way should the calendar grain run in a boot tap, and which way in an auto tube?" How much and what kind of filler should a fellow put into his friction and skim coat compounds?" "Why does everybody make his top cushion of pure gum, when it is flanked on the one side by a stiff ply of body fabric, and on the other by a compounded breaker stock?" "Shall I adopt a black tread, and secure maximum wear at minimum cost, or a white tread and keep my breaker in place, even at a higher cost?" "What makes my auto tubes go baggy after a few hundred miles?" Why the infernal generation of heat in the bowels of my solid tire tread?" "Why all these cracks in my side cusion?"

Research an Aid to the Practical

These and countless other problems of like difficulty, and yet of cardinal importance, demand explanation and so research. The practical man will never solve them unaided. They will yield only to the thoroughly trained technologist who has passed through the practical or works stage and who has now reached the stage where he wants to settle down and do some fundamental work.

The question is by what tools is he going to do the job. What advances have in fact resulted from the last decade of published research? Take, first, the reams of papers that have been devoted to plantation research. I mean work such as that of Eaton and his collaborators on the causes of variability. The results of his work have been of cardinal interest to us all, to be sure; and yet Eaton, as you all know, made a mountain out of a mole-hill. Every factory man knows that when he has reduced Eaton's High Sulphur Content, added the customary fillers, and finally drowned the natural nitrogenous accelerator by the addition of a couple of pounds of hexamethylene—when all of this has been done there is precious little variability as to rate of cure left to worry about.

* Address to Rubber Section, Toronto Branch, Society of Chemical Industry, February 27, 1920, Courtesy of Canadian Chemical Journal.

If Eaton had spent more time developing a rubber that could be frictioned properly on to cord fabric without distorting it and yet without losing its tensile properties after the cure, or if he had found out why fine Para makes cements that are about twice as good as any that can be made from plantation gum, he'd have earned our undying gratitude.

Again, take the papers that have been published on organic accelerators. The air is thick with speculations as to how this or that radical reacts with the sulphur. Or does it directly polymerise the rubber molecule? Or does it merely generate nascent or collodial sulphur. Most of us, I take it, are thoroughly weary of all this for the most part conflicting evidence. We have all tried out three or four standard accelerators, have selected one or two which best meet our requirements, have worked out the optimum proportions and vulcanizing conditions, and having done this would fain pass on to some of the other problems referred to a few minutes ago.

Or take the bugbear of the *coefficient of vulcanization*—the most abused term, I submit, in the whole realm of rubber chemistry. Dozens, yes hundreds, of researches have been devoted during the last few years to this elusive constant which is not a constant. One man finds it an admirable index of state of cure; the next worker finds that the first man forgot to consider ageing conditions; then along comes worker number three and proves that neither of the others had allowed for the thickness of the samples during the cure; while finally worker number four comes along and shows that none of the others had allowed the requisite number of months for the acetone extraction of the free sulphur and so they were all wrong. The result is, we know less about the famous coefficient of vulcanization than did C. O. Weber himself. No one even knows how to analyze for it in the presence of metallic oxides.

Finally take that crowning triumph of rubber chemistry, "Synthetic Rubber." The chemist tells us that rubber's correct name is dimethylcyloctadiene, and to prove it, goes ahead and makes up some. But the dimethylcyloctadiene he submits to us is no more like fine Para than "Near Beer" is like Molson's Pale Ale.

The point is, that we have been suffering from a distorted vision in our methods of attack upon the great outstanding rubber problems. We have leaned too heavily upon chemistry. We have forgotten that we deal here with a member of that maddening and yet fascinating group of bodies known as colloids. We ourselves are colloids. Every living thing is a colloid. Rubber is a colloid, and indeed rubber is in very many ways a living thing. Its properties change day by day. They are a function, not only of its composition, but also of its life history. From the moment when it issues from the tree, rubber as a colloid begins to lead a life full of whimsical changes. It starts, for example, by being a non-reversible aqueous suspensoid. The moment it is coagulated and dried it becomes a perfectly reversible organo emulsoid.

Physics Needed to Solve Rubber Problems

We have got to turn our backs for a time upon our chemical methods, and revert to the good old physics of Victorian days, or we shall never tame this shrew. It is no wonder the chemist has gone so far afield. He is dealing with a substance which has neither melting point nor boiling point, which has no fixed solubility nor even composition. The moment he get its pure it becomes technically worthless.

It is to physics and physical methods, therefore that we must turn to pin down this elusive body. Rubber does indeed exhibit the most fascinating array of physical properties of any substance listed amongst the world's structural materials. In its unvulcanized condition, it lies on that difficult border line betwen the liquid and the solid states. Viewed as a liquid, its viscosity demands our attention in the guise of "nerve," as shown in the difficulties of calendering and milling in our factories. Its colloidal memory, by which it retains the imprint of the working received in our mills and calenders, is known to us as "calender grains."

After vulcanization it achieves a tensile strength, which figured on the cross-section at break, may exceed twenty tons to the square inch, thus placing it in the class of mild steel. Coupled with this enormous strength, it shows, of course, a distensibility hundreds of times greater than that of the other materials used in structural work. It is the only substance known for which the elastic limit extends right up to the rupture point. In one regard, few people nowadays realize its extraordinary powers; that is, its "proof resilience," viz., the number of foot pounds of energy that can be stored in unit weight of the material. If you stress a pound of tempered spring steel to its elastic limit, you can store in it 95.3 foot pounds of energy. If you do the same thing with structural nickel steel, you can store only 14.7 foot pounds of energy. Even if you take hickory wood along the grain, you can only tie up 122.5 foot pounds in a pound of the material, but a high-grade soft rubber will store for you upwards of fifteen thousand foot pounds per pound of material, in fact, if you took one hundred pounds of rubber on a bicycle in the form of rubber thread, and wound it up to nearly the elastic limit, I estimate that this would run your bicycle sixty miles before you need re-wind your rubber. This fact was, of course, made full use of in the old days when rubber was used as a buffer in railway work.

Stress-Strain Relationship of Rubber

Among the many interesting physical properties of rubber, perhaps the most extraordinary is its stress-strain relationship, which brings me to my main topic. The general characteristics of the rubber stress-strain curve are, of course, familiar to everyone. They were first described in detail by Villari in 1869. Hooke's Law of proportionality of stress to strain, which is universally true of most of the structural materials within their elastic limits is of course not valid. The ratio of stress to strain is constantly changing. In other words, Young's modulus of elasticity is in the case of rubber not a constant but a rate. Nevertheless, rubber is the only substance for which Young's modulus is anything else than a mathematical calculation. You can actually measure Young's modulus in the case of rubber, because you can stretch it to twice its length and measure the stress required to do so.

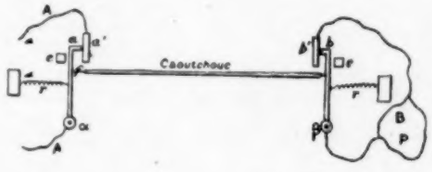


FIG. 1. RATE OF PROPAGATION OF LONGITUDINAL WAVES

Rubber is the only substance for which the elastic limit extends out as far as the actual rupture point. Whereas, in the case of metals, the first part of the curve is stiff and the later parts show a yielding region, vulcanized rubber is yielding at first but stiffens or tightens up later on. It shows, as it were, a hand of steel encased in a silken glove. These extraordinary stress-strain relationships of rubber attracted the attention of some of the most brilliant physicists of the 19th century.

The most exhaustive and at the same time masterly studies of the elastic properties of vulcanized rubber were carried out by Prof. H. Bouasse of the University of Toulouse, who published his memoir in 1904. Bouasse had carried out extensive work on the elastic properties of other materials and was attracted to rubber by the unequalled large scale of its properties of extension. He saw an opportunity of, as it were, magnifying the ordinary elastic constants and being able to study the phenomena of hysteresis and of the effect of temperature on these properties to better advantage. Bouasse worked in the main with pure gum mixings only—i. e., those containing only rubber and sulphur. It is a matter of infinite regret that the early masters who did such basic pioneer work on the physics of rubber knew so little about the industry, and in consequence failed to give the exact state of cure of their samples, and, what is more to be re-

gretted, took no cognizance of the character or degree of mineralization of their material.

The accompanying figures will illustrate some of the physical apparatus used by Bouasse and others in the accurate measurement of the all-important elastic moduli at various points along the stress-strain curve. For details you must consult the original memoir.

Rate of Propagation of Longitudinal Waves

This apparatus was used in 1872 by Stefan and later by Exner, for determining the elastic modulus of vulcanized rubber by measuring the rate of prepartion of longitudinal vibrations. The rubber thread is stretched between the metallic bars A and B, which are free to move around their axes, α and β. In the beginning of the test, the circuit A is closed and the circuit B is short-circuited. The silk thread fastening the rubber to the piece A is then burnt through. Immediately the circuit A is broken, and a chronoscope begins recording. A longitudinal wave then advances along the rubber thread, diminishing the tension along it. After a short space of time, when the wave has reached B, the spring R separates B from B', opening the short circuit and thus closing the circuit B, which again registers on the chronoscope. The elapsed time is thus recorded betwen the two ruptures $A\,A'$ and $B\,B'$. The length of the rubber thread divided by this time gives the velocity of propagation of the longitudinal wave. Since if E be the elastic modulus,

$$V = \sqrt{\frac{g\,E}{\delta}} \text{ or } E = KV^2.$$

Bouasse subjects the validity of the results obtained by this experiment to very trenchant criticism. For example, the tension varies all the way from its initial value to zero, or that of the spring R, so that the resultant value of the modules cannot be identified with any one point on the stress-strain curve. Again, the rapidity of the experiment raises the question as to whether the modulus is an adiabatic or isothermal one. The effects of hysteresis and the secular changes due to the elastic after-effect, in his opinion, severely detract from the value of this method.

Stationary Wave Method

This figure clearly shows the set-up. The rubber sample EF is stretched to various degrees and is given longitudinal impulses by an electrically maintained tuning fork. A stationary wave is formed, and the internodal distance is readily measured on the attached scale. This method is interesting theoretically. The wave length taken together with the period of the tuning fork allows the calculation of the velocity of propagation, and as before, $E = KV^2$.

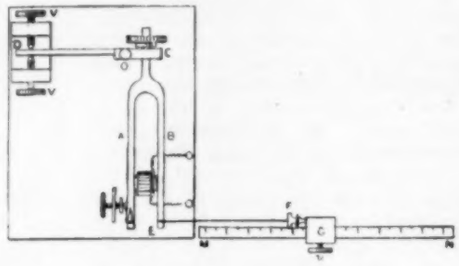


FIG. 2. STATIONARY WAVE METHOD

Bouasse points out here again that the phenomena is altogether too complex to yield accurate results by such simple treatment. The amplitude of the vibrations rapidly diminishes away from the tuning fork. Energy absorption, because of hysteresis, is thus a severe disturbing factor. The result is that the experimental accuracy of determination of the internodal distance is not high. The method is, of course, convenient, and as Bouasse puts it, "d'une incontestable elegance."

(to be continued)

Chemical Abstracts

Analysis of Mineral Rubber

The following determinations are made.

1. Moisture.

20-25 gram sample is dried in a flat dish at 100°C or in a vacuum over P_2O_5 or H_2SO_4.

2. Volatile Petrolenes.

For this determination a sample is heated for 2 hours at 180°-100° or 200-250° and the volatile part determined.

3. Petrolene.

In a tared Erlenmeyer flask of 250cc capacity, 1 gram of the finely pulverized sample is treated with 150-200 cc. of Petroleum ether and allowed to stand for 12 hours and poured through a tared filter and 100cc more of petroleum ether added and allowed to stand. When the solvent becomes colorless then the residue is thrown on to the filter and washed with petroleum ether and dried at 100°C. and the Petrolenes determined by the loss in weight.

4. Asphaltene.

The filter and the Erlenmeyer were successively washed with turpentine oil and chloroform. The increased loss in weight gives the amount of asphaltene present.

5. Organic Substances.

Incineration of the filters of 3 and 4 gives as the loss in weight after deducting the bitumen the organic substance.

6. Ash.

This is already in 5 as the residue determined and may be analyzed further.

7. Sulfur.

This is accomplished by oxidizing with fuming nitric acid and determined in the well known manner as bauium sulfate.

* A Dubosc and Wavelt. Le Caoutchouc et La Gutta Percha. 16.100039.

A New Method of Making Hexamethylenetetramine

Ammonia carbonate is dissolved in 40 per cent formaldehyde solution and the reaction takes place between the NH_3 and the formaldehyde solution. After the ammonium carbonate is in solution the solvent is distilled off on a water bath under diminished pressure and a relatively good yield of hexamethylene tetramine is obtained.

Example.

70 grams of commercial ammonium carbonate are dissolved in 146 grams of commercial formaldehyde solution and then the solution is evaporated to dryness on a water bath under diminished pressure.

The yield of the crude product is about 28 grams coresponding to 66 per cent of the theory calculated on the formaldehyde.

By recrystallizing from absolute alcohol or by vacuum sublimation th ehexamethylenetetramine is obtained in the pure state.

* Dr. Ing. Walter Herzog. Zeitschrift fur Angewandte chemie, Vol. 33. No. 16, page 48.

Process for the Production of Piperdine Piperidyldithio-Carambic Acid

Carbon disulfide is allowed to react on an aqueous solution of piperidine at low temperature. By using a water solution the eraction proceeds moderately. The piperidine piperidyldithoicarbamic acid serves as an accelerator of vulcanization.

* Farbenfabriken form, Friedr. Bayer & Co., German Patent, 316,009.

News from the Trade at Large

United States New Financing Plan—New McClaren Tire—Fisk Opens Oakland Warehouse—McBride Now With New Castle—Wildman Purchases Biltwell Tire—Dixie Rubber Builds

United States New Financing

Official announcement regarding the much talked of United States Rubber Company new financing plan was made on Friday, July 16, by Colonel Samuel P. Colt, chairman of the board of directors of the corporation. According to Col. Colt, his corporation has sold Kuhn, Loeb & Co. $20,000,000 ten year seven and a half per cent notes, secured by $25,000,000 six per cent bonds, issued under the company's first and refunding mortgage of January 2, 1917. Speaking about the new issue of notes Colonel Colt said: "Owing to the present time being unfavorable for the placing of long term bonds on advantageous terms, the directors felt that it was in the interest of the company to borrow upon the bonds for a shorter period of time rather than to sell them under existing conditions, and therefore the $20,000,000 of ten year notes, with the bonds as collateral, were issued. The bonds themselves run for thirty years from January 2, 1917.

"The proceeds of this sale of notes, with the current surplus earnings," Col. Colt added, "will give the company sufficient funds for the completion of the plant extensions now in progress at Detroit, Hartford, Providence and Indianapolis, for the increase of the company's tire production, which is far below the demand."

Col. Colt also pointed out that the company does not contemplate any further financing and it is not expected that there will be another meeting of the board of directors before the middle of September.

The remarkable growth of the automobile industry during the past few years and especially since the close of the war is strikingly shown in the expanding production and increasing prosperity of the rubber companies. In connection with this trade authorities assert that a large demand for rubber footwear will accrue this fall when dealers replace stocks depleted by last winter's severe weather.

New McClaren Tire

In announcing the McClaren Autocrat cord tire, now being introduced to motorists through dealers, the McClaren Rubber Company believes the last word is spoken in tire construction. The Autocrat is the result of twenty years of experience in the industry. Men responsible for it, headed by H. L. McClaren, are among the best known and most successful and have taken part in every step of tire progress. Dominant features of the McClaren Autocrat cord tire are attractive appearance, perfect balance, oversize, double grip groove tread which prevents skidding and the mileage strip which assures big mileage.

Fisk Opens Oakland Warehouse

The Fisk Rubber Company opened its Oakland, California, warehouse during the last week in June. The building is located on Second street, between Brush and Castro streets, Oakland, extends back to First street, where it is connected with the main Southern Pacific railroad lines by a spur track capable of accommodating three cars.

The warehouse is four stories high and contains 70,000 square feet of floor space. It is constructed of reinforced concrete which renders it fireproof, and in addition the contents are protected from fire by sprinklers and the A. D. T. fire alarm system.

The building was taken possession of by the Fisk Rubber Company on May 18, and in the meantime they have been stocking up with pneumatic tires, inner tubes, solid tires, repair materials and accessories to keep their branches and agencies supplied with goods from this distributing center.

The area of distribution covers fourteen branches in Washington, Oregon, California and Nevada; one agency in Hawaii and a dozen agencies scattered throughout the Orient, Australia and New Zealand.

The distribution of stock will be under the supervision of William Moonie, who has been associated with the Fisk Rubber Company for the past ten years in their San Francisco branch, and was lately promoted to be manager of their Oakland warehouse.

McBride with New Castle

Announcement has been made by Vice-President and General Manager William E. Duersten of the New Castle Rubber Co. of New Castle, Pa., that Paul A. McBride, formerly president of the Pittsburgh Knife and Forge Company, has connected himself with the rubber concern, having been elected as fiscal agent of the company.

In the capacity of fiscal agent, Mr. McBride will handle the increase of capital stock from $500,000.00 common and $500,000.00 preferred to $3,500,000.00 common and $500,000.00 preferred. This increase in the capitalization is made necessary through the rapid strides that the company has made since locating in New Castle.

Firestone Sails for Europe

H. S. Firestone, president of the Firestone Tire & Rubber Co., sailed recently on the *Olympic* on an inspection tour of the Firestone interests in Europe.

Wildman Purchases Biltwell Tire

The Wildman Rubber Company has recently purchased a controlling interest in the Biltwell Tire & Rubber Company, of Akron, and according to reports will manufacture at the Biltwell plant and the new plant at Bay City, Mich.

Following the resignation of the officers and directors of the Biltwell Tire & Rubber Company the following board of directors was elected: W. W. Wildman, Detroit; L. C. MacGregor, Detroit; C. R. Twynham, Akron; George W. Seiber, Akron; J. C. Clinefelter, Akron; E. H. Trump, Akron; B. O. Etling, Barberton, A. F. Stuehldreher, Barberton, and M. Braley, Akron. The following officers were also elected for the Biltwell Tire & Rubber Company: W. W. Wildman, president and general manager; M. Braley, vice-president, and C. R. Twynham, secretary and treasurer.

The Biltwell company has at present a daily capacity of 500 tires and 1,000 tubes. The financing of this company will in the future be handled by the Wildman Rubber Company and additions which will double its capacity are expected in the near future.

Dixie Rubber Company Builds

Involving an expenditure of $120,000, the first unit of the Dixie Rubber Company's $1,000,000 plant at Memphis, Tenn., is to be constructed this summer. The equipment and machinery will cost twice as much more. The factory is to be completed on the 15-acre site and is to be in operation on January 1.

It will have a daily capacity of 500 casings and 500 tubes daily. Other units will be added as the business expands. Authorization of the building contract was made recently at the meeting of the board of directors.

Among the directors are President E. V. Catoe, vice-president of the Yazoo State bank; M. T. Bynum, cashier Bank of Webb; R. P. Cook, president of Hernando bank.

New directors chosen were P. M. Bischon, George A. Brusch and E. J. Thomas of Memphis, and Robert J. Newton, of Newton, Miss.

Terrell Tire Organized

The Terrell Tire & Rubber Co., is the name of a firm organized in Kansas City, Mo., with an authorized capital of $1,000,000, for the purpose of manufacturing tires, tubes and other articles of rubber. This firm has the exclusive right to manufacture the Fabri-Cord tire, invented by A. C. Terrell, of Kansas City. Officers of the company are A. C. Terrell, president; Otto W. Croy, vice-president; R. L. Meierhoffer, secretary an dtreasurer. These together with H. F. Zahner and George B. Duden form the board of directors of the newly organized company.

Earthquake Shocks Halt Production

Hundreds of workers failed to report for duty on July 17 at the Goodyear Tire and Rubber Co. plant in Los Angeles, Cal., because of the near-panic that gripped the city following slight earthquake shocks that occurred the previous night.

The three major tremors on July 16 which slightly damaged scores of buildings in Los Angeles, Pasadena and environs set the residents aquiver, and the hundreds of Akronites who came to Los Angeles to work for the Goodyear were no exception.

The huge plant at Ascot Park passed through the quake undamaged.

Hundreds of women employes in the rubber plant and the cotton mill quit work on the morning of the 16th when the first severe quake rocked the city. The majority, however, returned to their post when assured by officials that the buildings were strong enough to resist the strongest tremors.

In the near panic that followed the quakes of extreme severity in the afternoon, the majority of the workers refused to return indoors and the Goodyear was forced practically to close down, as were all other factories and department stores.

Scores of the Akronites are threatening to return east because of the increasing frequency of the quakes.

The tremors were the worst that have struck the coast since the San Francisco disaster.

Excitement was highest in the cotton mill, which had opened a few days before where half of the 600 employes are women.

Most of the Akronites are employed in the rubber plant. No one in the Goodyear plant was injured. None of those hurt by falling bricks in the downtown section was from Akron.

Both President Osterloh and Publicity Manager Miller emphasized that relatives of Goodyear employes have no cause for worry for the new plant was specially designed to withstand the severest quakes.

Sterling Tire Announces Dividend

At a regular meeting of the board of directors of the Sterling Tire Corporation, Rutherford, N. J., which was held on July 6, the following dividends were declared: Regular quarterly dividends of 1¾ per cent on the outstanding 7 per cent preferred stock of the corporation; regular quarterly dividends of 2 per cent on the outstanding series B. preferred stock; a dividend of 1 per cent on the outstanding common stock of the corporation. All of the foregoing to be paid July 20 to stock holders of record July 6. The announcement was also made to the effect that the Sterling Tire Corporation was running to capacity and was considerably behind on unfilled orders.

Dunlop Manager Returns

Following the return of J. Westren, general manager of the Dunlop Tire & Rubber Goods Co., Limited, from a lengthy sojourn in England and on the Continent, W. B. Northam, general sales manager of the Dunlop Company, has sailed for the Old Country. He will be gone two months.

Canadian and American Workers Meet

A unique feature at the Dunlop Rubber Company's outing this year was the meeting of Dunlop Canada and Dunlop America on the historic grounds of Niagara. Dunlop America, Limited, is the new rubber industry launched this year in the United States by the Dunlop rubber interests of England.

When the outing of the Dunlop Tire & Rubber Goods Co., Limited, was being planned in Toronto for July 24 to Niagara-on-the-Lake, the suggestion was made to have the employes of Dunlop America cross over into Canada and hold one big day with their brother rubber men on the Canadian side of the line. The upshot of the suggestion was a series of games —and a medley of sports in general—in which the employes of both companies, and their families, took part.

The unique setting of the affair, however was in the form of a letter which J. Westren, general manager of the Dunlop Company in Canada, despatched through an emissary to P. D. Saylor, general manager of Dunlop America, Ltd., of Buffalo, N. Y. This letter touched on the significance of the gathering, wished them success in a business sense, and hoped for many happy returns of this particular event. A miniature Canadian ensign was enclosed.

Mr. Saylor's emissary brought a reply, containing a reference to the prosperity of the industry in general, and speaking of the pleasure "Baby" Dunlop of Buffalo had in meeting "Brother" Dunlop of Canada. The epistle was accompanied by a minature Stars and Stripes.

New San Antonio Plant

The Bear Rubber Mills, Ltd., is the name of a new firm which has recently purchased land in San Antonio, Texas, and which is at present erecting a factory for the manufacture of tires and tubes. The president of the new concern is Don E. Cameron, formerly general sales manager of the Hawkeye Tire & Rubber Co., of Des Moines, Iowa, and also at one time indentified with the Goodyear Tire & Rubber Co., of Akron.

The location offers great advantages for a rubber mill and its employes. The railroad is directly in front of the site. The San Antonio River is directly in the rear, offering an abundance of water.

When finished, the building will be the most complete in the state. It will be 100 feet wide and 44 feet long, of solid steel and concrete, with modern glass lighting efficiency. Every modern device has been ordered and will be installed.

When completed the Bear Rubber Mills will have the capacity to turn out 1000 tires, 2000 tubes, with 300 men employed at each of three shifts per day.

All material necessary for production has been contracted for and delivery assured.

The Bear Rubber Mills, Ltd., will build only standard construction tires and tubes—barring all freak designs not demanded by commerce—this to come in the ruling of the Rubber Manufacturers' Association on standard tires and tubes.

Rubber Association Bulletin

The Rubber Association of America, Inc., has recently issued the following bulletin to members regarding the revised classification specifications for various rubber articles:

Revised Classification Specifications for Various Rubber Articles

JULY 19, 1920

The Consolidated Freight Classification Committee has issued Supplement No. 7 to Consolidated Freight Classification No. 1, effective August 15th, 1920, in which various changes in ratings of interest to the members are published, and which are the result of applications made by the Traffic Committee of the Association.

Friction Fabric—The classification at present provides that friction fabric will only be accepted for transportation when presented for shipment in burlapped rolls or in boxes. The supplement to the classification provides that effective on the above date, this commodity may be accepted for transportation when shipped "in crates".

Classification of Crude Rubber in Western Classification—The present ratings for crude rubber in carloads between points governed by the Western classification, i. e., from Eastern territory to points west of the Mississippi River and between points west of the Mississippi River, including the Southwest, provides first class rates in shipments in less than carloads and second class rates when in carloads.

Effective on above mentioned date, crude rubber in territory governed by the Western classification will be subject to second class in less than carloads and fourth class in carloads.

Rubber Compounds—The Classification Committee has published ratings on rubber compounds, in slabs not cured, that will be a reduction to those in effect on crude rubber, namely, second class in less than carloads, fourth class in carloads, minimum carload weight 40,000 pounds.

A. L. VILES, General Manager.

Gibson with Lancaster Tire

Richard Gibson, Jr., formerly technical superintendent of the Hewitt Rubber Company, of Buffalo, N. Y., has been appointed technical superintendent of the Lancaster Tire & Rubber Company, of Lancaster, Ohio.

When Mr. Gibson graduated from Cornell University in 1913 he became assistant-chemist of the Racine Rubber Company and later of the Kelly-Springfield Company ,of Akron, Ohio. In 1917 he was appointed tire development engineer of the Republic Rubber Company of Youngstown, Ohio, from which position he resigned to accept a commission in the Chemical Warfare Service, and was stationed at the Goodyear and Goodrich Companies, of Akron, and the Continental Rubber Works , of Erie, Pennsylvania, where he was engaged in the manufacture of gas masks.

Conditions in Akron Improve

Officials of Firms in the Rubber City State They Contemplate no Further Cuts in Working Forces—Rubber Machinery Manufacturers Remain Unaffected

The end of a slump in rubber manufacturing in Akron was seen recently, when officials of several factories announced they had started rebuilding their organizations. Further cuts in the number of employes are not expected by rubber company officials.

Denial of a rumor that thousands of persons have had to leave Akron to obtain work was made by A. A. Berry, head of the State-City Free Labor Exchange.

Some of the rubber factories, notably the B. F. Goodrich Co. and the Kelly-Springfield Tire Co., have made no reductions in their forces or in working hours. Other factories report having made cuts of from twenty to thirty per cent.

Production has been affected only slightly, rubber officials assert. They say the men laid off have been, as a general rule, inexperienced.

As a result of the cuts the larger factories have discontinued the third shift in several departments and have changed third shift employes to day duty.

Akron plants have a labor turnover of 250 per cent a year according to figures compiled by the Labor Division of the Goodyear Tire and Rubber Co. Reductions in that plant have been made mainly by not hiring men to take the places of those who left, officials said.

William O'Neil, in charge of factory labor of the General Tire and Rubber Co. said that all of the 110 men laid off by the plant had been with the company less than three months. He said the factory was operating under abnormal conditions last spring and that 10 per cent more men are now employed than were working last summer.

He said that in part the slump was due to the fact that tire dealers, believing a general increase would be made in prices, laid in a heavy stock of goods for spring delivery and do not need to replenish stock at this time.

All officials interviewed were of the opinion the condition is temporary and that factories will again be working full forces within two or three months.

F. E. Holcomb, Sr., general manager of the Williams Foundry and Machine Co., said that industries manufacturing rubber factory machinery were not affected.

"Loss in production has not been great," said W. R. Murphy in charge of labor at the Firestone Tire and Rubber Co., "because for the most part those who have been discharged were beginners who had not thoroughly learned the trade.

Anyone who is willing to work for sixty cents an hour for nine or ten hours a day can be placed in Akron at once according to A. A. Berry, of the Free Labor Exchange, daily average of 150 men and fifty women are being placed, he said.

Many young men, according to Mr. Berry, do not care to remain in Akron and are being sent by the Bureau to other centers where skilled labor is in demand. Mr. Berry said that preference was being given to married men and with families in locating permanent, skilled employes.

Railroad and farm labor and many branches of skilled labor are in great demand and in the first two cases experience and skill are not requisite for employes, he pointed out.

Rubber plant employes offices announce few men are being hired. The B. F. Goodrich Co., is still hiring rubber workers and laborers to replace the normal labor turn-over, but the supply exceeds the demand.

Tube Plant for California

Announcement has been made by J. F. Scanlon, advertising manager of the United States Compression Inner Tube Company, with home offices and factory in Tulsa, Okla., of the purchase by his firm of a tract of twelve and one-half acres in Burbank, California, on which a rubber factory will be built within the next few months.

The new plant will have an initial capacity of 1000 puncture proof inner tubes and 500 casings daily, with plenty of room for increase in the factory and its output as soon as the domestic and foreign trade radiating from Los Angeles warrants a larger outlay.

The new factory here has been under consideration by President Hale and General Manager A. J. Pennington of the Tulsa firm since early in the year. Mr. Hale visited Los Angeles in company with Mr. Scanlon in February and looked over a number of sites. Since then negotiations have been under way until the final deal was consumated.

The plant at Burbank will be the third unit in the Tulsa construction program. The main factory at Tulsa is designed to care for the Middle Western trade; a factory now in course of construction at Kittanning, Pa., will supply the Eastern States and transatlantic demands, while the local output will take care of the Western and Pacific States and the Oriental trade.

Temporary offices of the United States Compression Inner Tube Company have been established in the Citizens National Bank Building by C. R. and W. E. Privett, distributors of the product in seven Western States, and will be maintained at least until the completion of the new plant. The construction force at work on the Kittanning buildings will be rushed to Burbank as soon as they complete their work there, which, it is expected, will be within the next few weeks.

Training Future Executives

Training schools for future executives have become a necessity in modern industrial concerns. Companies that employ thousands of workers realize that the men who will direct their destinies must be thoroughly schooled from every angle.

Prominent among the big companies that are taking this line of procedure is the Goodyear Tire & Rubber Company, Akron, Ohio, which, through its "flying squadron" system trains its factory men in every phase of the manufacture of automobile tires, mechanical rubber goods and associated products.

Beside laying the educational foundation for future executives, the flying squadron training imbues workers with a breadth of vision, creates initiative, goodwill, contentment and encourages ambition. In addition it assures and balances production.

About ninety-eight per cent of the men who have graduated from Goodyear flying squadrons have been promoted to responsible positions—some even to executive places. One graduate is now a superintendent over 7,000 men. Most of the foremen and inspectors are former squadron men. Originating five years ago, the first squadron had but fifty members. Now there are fifty squadrons totalling 1150 men, nearly four per cent of employes. New plans put the percentage fifteen per cent of the total number employed—about 2,500 men.

Candidates get an opportunity to learn manufacturing thoroughly. They are put at work in one department after another until they know every operation. This training is supplemented by two hours a week class instruction on company time. In this manner the men come into contact with the factory executives. Company policies and methods of management are explained, the candidates also being given opportunity to criticise poor work or production methods. They may suggest improvements. Each day they are sent to departments where men are absent from sickness or other causes to plug holes and maintain production. After three years they are rated as master rubber workers—an enviable and well-paid position. After that rating has been attained, the graduate is promoted according to ability, as expansion creates new positions.

Nearly ten per cent of the squadron members are college graduates who welcome the chance to receive a thorough technical education with excellent opportunities for the future.

As an instance of the value of squadron members as the nucleus around which expansion is done, out of 150 men sent to the company's new factory in Los Angeles, 105 were squadron members.

New Virginia Company Formed

The Virginia-Carolina Rubber Company, Inc., has been formed at Richmond, Va., with capital stock of $50,000 to $200,000 to manufacture and deal in tires and rubber goods. R. J. Bell is president and Charles L. Schackelford is secretary.

Seger Predicts Good Business

Charles B. Seger, president of the United States Rubber Co., who has recently returned from a tour of inspection of the company's plants in this country and Canada, predicts continued activity in the tire industry for some time to come. Mr. Seger recently voiced his opinion as follows:

"In going through Massachusetts, Connecticut, Michigan, Ohio, Indiana and New York and parts of Canada, everywhere I met with the same situation that has existed for many months. Practically every industrial plant seems oversold and to be endeavoring to speed up production. In practically no line of industry did I see any marked tendency toward contraction.

"Fortunately for the United States Rubber Co. our expansion program was started so well in advance of the present heavy demand for rubber goods that we now have a considerable part of our enlarged manufacturing facilities on a production basis. Our new factory in Providence, the old Alco automobile plant, is now in full operation. Our extensions in Hartford, Indianapolis and Detroit are sufficiently advanced to aid us materially in keeping pace with the demands upon us.

"Indeed, if automobile production should decline perceptibly I believe the rubber companies in the United States would still have their hands full supplying tires for the existing number of trucks and automobiles. People little realize the extent to which the automobile has become principally a means of transportation.

"The unusual railway transportation situation that has existed throughout the country for some time, due in some cases to strikes and in others to shortage of cars and power, has thrown a heavy load on the rubber companies; automobile truck transportation is being called on more and more for both short and long distance freight work. I believe when normal conditions are restored that the automobile truck is going to prove of increasing importance in solving the country's freight transportation problem.

"The most striking thing I noticed in going through the country was the great amount of new building construction. You see it on the farms, in the small towns, and in the large cities.

"Certainly there are no indications, so far as the rubber industry is concerned, that the present industrial activity will not continue uniterruptedly in the coming year. In the demands for rubber footwear, clothing, tires and mechanical goods, our factories see ahead of them for a long time to come considerably more than they can do fully to meet the country's demands."

Western States Tire in California

The Western States tire manufactured in Spokane, Washington, has entered the Southern California market under the sponsorship of the Tire Sales Company, a new corporation formed by W. D. Newerf, W. S. Melcher and Carl Newerf, all prominent figures for many years in the Los Angeles tire world.

"Eastern Washington and Idaho is a wonderful country, but they haven't got around to building many boulevards up there yet," said W. D. Newerf. "The motor cars in use up there literally follow in the tracks where the buckboard, the lumber wagon and the cowpony furnished the only means of transportation a few years ago. As may be imagined, it is a tough country on tires. So much so in fact that a strong local demand grew up for a tire that would stand unusual abuse.

"As a consequence the Washington Tire & Rubber Company was formed in Spokane and they built a tire especially to meet local conditions. It was built by veterans of the big eastern factories, and was of conventional design except that it was of extremely heavy construction. Five plies of the heaviest fabric obtainable went into the making of the carcass, and an unusually heavy rubber tread furnished the wearing surface. Where the ordinary Ford fabric tire weighs twelve pounds the Western States tire of that size weighs seventeen."

Robert I. Monroe Passes Away

Robert I. Monroe, erecting engineer for the Hunter Dry Kiln Company died suddenly of heart disease Saturday, June 19th at his home in Indianapolis, Ind. Mr. Monroe became associated with the Hunter Dry Kiln Company shortly after its incorporation and acting in the capacity of erecting engineer had occasion to visit many of the well known rubber factories where he made numerous warm friends who appreciated his trustworthiness and strong personality. Mr. Monroe was thirty-seven years of age. A widow and four children survive him.

McGinnes Now with India

J. E. McGinnes, widely known in the tire field, has been placed in charge of Sales Promotion work for the India Tire & Rubber Co., of Akron. He brings to his new position extensive experience not only in the development of tire distribution but also in the executive department of sales work. He was formerly branch manager for the Firestone Tire & Rubber Co. in Milwaukee. He also established a wide acquaintance in the trade as manager of tire sales for the General Tire & Rubber Co., of Akron.

Erie Declares Dividend

The Eire Tire & Rubber company has declared a 7 per cent dividened to preferred stockholders of record of July 1, 1919.

This well-known company is rapidly becoming a factor in the high-grade tire industry. Additions and enlargement of its factory facilities are in process.

Sixth Exposition of Chemical Industries

Returning to New York City after an absence of a year—last year's exposition was held in Chicago—the Sixth National Chemical Exposition of Chemical Industries will open in Grand Central Palace, September 20 and continue until September 25, inclusive. The expansion in the industry, as shown by the increased number of exhibitors, necessitates the use of four floors in the Palace, and Charles F. Roth and Fred W. Payne, managers of the show continue to receive applications for space almost daily, so great is the interest in the exposition.

Total applications for space up to June 30, were 358, which is a new record. In Chicago last year there were 351 exhibitors, while at the previous New York show in 1918, the number was 334. Considering the fact that the first exposition was staged in 1915 and that only eighty-three exhibits were in place, the growth of the exposition is really remarkable. The increase in the attendance is also evidence of the interest that has been aroused. In 1915 only 63,000 visitors attended the show, while in Chicago last year the records showed that more than 111,000 had seen the exposition.

Two new sections will feature the exposition this year. These are the Fuel Economy Section and the Materials Handling Section. Both are considered very important. Fuel Economy section will embrace exhibits of machinery and apparatus, furnaces, producers stokers and all devices for the economic utilization, or more efficient combustion of fuel. The constantly mounting cost of fuel as well as its increasing scarcity makes enlightenment on these vital subjects necessary.

In the Material Handling Section will be a series of exhibits showing machinery and equipment for the handling of material such as: conveying, transporting, elevating, and included will be weighing, measuring and power transmission equipment.

Practically every industry in some phase of its operations must convey its products in some manner. There is a shortage of man power, and when available man power demands a high wage. In the meantime the manufacturer must handle his raw material, material in process of manufacture, and the finished product. It is expected that the Materials Handling Section will impress with its features showing that machinery not only means economy, but also increased efficiency.

The business side of the exposition will have many interesting phases. These include sessions on subjects which will be developed in the two new sections of the exposition, and sessions on chemical engineering for which elaborate programs have been planned. Motion pictures which will have keen interest for technical men will be part of the program and there will also be addresses for the education of the public.

Rubber Association to Hold Outing

Announcement has been made by the Rubber Association of America, Inc., that the annual summer outing of the organization will be held at the Gedney Farms Hotel, White Plains, N. Y., on Wednesday, July 28. Tickets for the outing will be $10 each and it is requested that members do not remit with their orders for the tickets as statements will be rendered subsequent to the outing.

In choosing the Gedney Farms Hotel for the scene of the annual summer outing the association has registered a ten-strike. Located within easy striking distance of New York City it possesses a number of attractions not to be surpassed . The hotel has the finest golf course in Westchester County and a tournament will be arranged. Excellent tennis courts are to be had and a singles and doubles tournament will also be held. A swimming pool in the hotel building will be open to members and guests of the association for the entire day. In addition to the foregoing there are ample facilities for billiards, pool, bowling and horseback riding. Luncheon and dinner will be served and in view of the famed cuisine of the Gedney Farms Hotel it can be assured that these will be as near perfection as is possible.

The Gedney Farms Hotel is on Mamaroneck Avenue about three miles east of White Plains, accessible to those of the members and guests who may wish to motor from New York City or adjacent points, by a ride of about an hour and a half from 42nd Street, for which the following route is suggested as the most desirable.

North on Madison or Fifth Avenues, across 138th Street Bridge over Harlem River; up Mott Avenue from Bronx side of the Bridge and north on Grand Concourse; left turn at Moshulu Parkway South (one block south of large white concrete elevated station) into Jerome Avenue, and north to Central Avenue to White Plains and out on Mamaroneck Avenue to the Gedney Farms Hotel.

The station for the Gedney Farms Hotel is the White Plains Station of the Harlem Division of the New York Central Railroad. A very convenient train from the Grand Central Terminal to White Plains is an express which leaves at 8:50 a. m. (Daylight Saving Time), arriving at White Plains 9:28 a. m. (Daylight Saving Time), and returning to New York there is an express leaving White Plains at 9:27 p. m. (Daylight Saving Time), arriving at Grand Central Terminal at 10:06 p. m. (Daylight Saving Time).

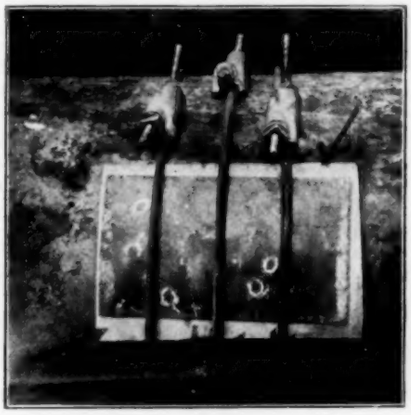
For those who may not find this convenient, however, a complete schedule of morning and evening trains is presented below:

Leave Grand Central Terminal (Daylight Saving Time)		Arrive White Plains (Daylight Saving Time)
8:25a. m.	Local	9:22 a. m.
8:50 a. m.	Express	9:28 a. m
9:39 a.m.	Local	10:36 a. m.
10:35 a. m.	Local	11:32 a. m.
11:00 a. m.	Express	11:39 a. m.
11:35 a. m.	Local	12:32 p. m.

Leave White Plains (Daylight Saving Time)		Arrive Grand Central Terminal (Daylight Saving Time)
7:01 p. m.	Local	7:56 p. m.
8:29 p. m.	Local	9:27 p. m.
9:27 p. m.	Express	10:06 p. m.
9:32 p. m.	Local	10:28 p. m.
10:24 p. m.	Local	11:20 p. m.
11:35 p. m.	Local	12:31 a. m.

Rubber Used for Leaky Mains

The accompanying illustration shows how the water department of Los Angeles



STOPPING LEAKS WITH RUBBER

uses rubber in stopping leaks in the water mains.

A large piece of rubber is placed over the hole, and a piece of metal is placed over the rubber. Then three metal bands are fastened around the pipe as shown in the photo. This holds water under very great pressure, and saves large sums of money to the city, as it eliminates the necessity of replacing pipes that have become leaky.

Michelin Completes Factory

Michelin Tire Company, Milltown, N. J., with the last change in tire prices no longer sell a higher price tire. A new factory has been completed and two other new plants will be ready next year. The company has twenty-eight factory branches including new ones in Memphis, Charlotte, New Orleans, Omaha, Lynchburg, Va. The Atlanta branch now employes thirty-seven fieldmen.

Goodyear Purchases Cotton Land

The Goodyear Tire and Rubber Co., through the Southwest Cotton Co., its subsidiary company, has purchased an additional 7,800 acres of land near Phoenix, Arizona, and will raise long staple cotton on the newly acquired land. This purchase brings the total area of cotton land in the Southwest by the Goodyear company to 36,000 acres. In addition to these holdings, the company has more than 20,000 acres leased for future expansion, making a total of 56,000 acres under its control. Out of this total, 30,000 acres are under cultivation and are producing long staple cotton.

Gutta Percha from the Philippines

Some interesting light is shown on the gutta percha industry by the Secretary of the Department of Commerce and Communications in the Philippines in a recent letter. Most of the gutta percha produced in the Islands is exported through the ports of Jolo and Zamboanga to Singapore, from whence it goes to Europe. The product is thus wrongly credited to the Federated Malay States. In composition and in many properties, gutta percha resembles rubber. It is used for many purposes, especially for insulating, being a poorer conductor of electricity than rubber.

The Secretary's office is now conducting an invesigation to find out why the product is not exported directly from Manila to the United States.

The Secretary, in his letter, points out that last year the Philippine exports of gutta percha amounted to 38,030 kilos, valued at $18,476. He believes that the volume of exports to the United States can be considerably increased through the employment of American buyers in the Philippines, with the establishment of a reliable market in the United States and the practice of direct shipments.

Recently when the laying of another trans-Pacific cable was under discussion it was alleged that the necessary gutta percha for insulation could not be secured as Great Britain had control of the world's supply.

The supply of gutta percha that can be secured in the Philippines is incalculable. It is classed as a minor forest product and is brought in by members of the non-Christian tribal, who live in the forests, in small quantities when they are in need of funds. No systematic effort has been made to secure a larger supply, and the competition among the Chinese traders for that which is produced is not very keen.

The Secretary also points out the existence of extensive areas for the cultivation of rubber plants, which are available; and that the great opportunities and ample Government protection are offered American and foreign capital invested in the Islands.

New Distributors for Standard Four

Under its new and more extensive sales policy, announced some time ago, the Standard Four Tire Co., of Keokuk, Iowa, is rapidly establishing new distribution points throughout the country.

Following close on the announcement of several new connections in the Southern territory, comes news of five important distribution appointments in the East, as follows: The McGraw Tire Sales Co., with headquarters in Buffalo; Wagner-Tracy Auto Supply Co., Inc., 222 Central, Albany, N. Y.; Hauck Brothers, Mechanicsburg, Penn.; Dawson Tire & Supply Co., of Newark, N. J.; Combination Ladder Co., Wholesale Auto Supplies, Providence, R. I.

According to F. R. Eyer, general sales manager, the company will continue opening up new territory in direct proportion to their increased production facilities.

Goodyear Rubber Arrives in Los Angeles

An event which emphasizes the importance of Los Angeles as an ocean port and its advantages in permitting the importation of a direct supply of raw material for the city's greatest industrial plant, is the receipt of a cargo of 600 long tons of crude rubber by the Goodyear Tire & Rubber Company of California, from its Far Eastern plantations.

The big shipment of crude rubber was brought across the Pacific in the Los Angeles-Pacific Navigation Company's freighter West Hika from the Goodyear plantations in Sumatra, and consisted of 7,476 cases of rubber valued at more than $750,000.

This is the first shipment of rubber that has come directly into Los Angeles Harbor for the Goodyear plant, to be used in producing California tires. It is the forerunner of the thousands of tons that will follow when the factory reaches the capacity production, which it is rapidly approaching.

Goodyear several years ago sent representatives to investigate rubber growing conditions in Sumatra, with the idea of protecting its rubber supply back to the source through the establishment of their own plantations. The company now owns a concession of 20,000 acres in Eastern Sumatra, near the city of Medan, about fifty miles from the seacoast. There the problems of rubber production are being worked out. The plantation is divided into six approximately equal parts, each under a separate manager. Labor troubles there are practically unknown, for the 10,000 and more employes have acquired the same spirit of service that has been so great a factor in the company's success in this country.

It is expected that the Goodyear Los Angeles plant will use about 18,000 tons of rubber yearly when capacity production is reached.

It is the aim of the company officials to bring as much rubber as possible directly into the Los Angeles harbor, but the limited number of boats plying between the Orient and Los Angeles harbor necessitates, for the present, the receipt of rubber cargoes at other Pacific ports, and the reshipping by rail to Los Angeles. As Los Angeles harbor becomes a port of call for a larger number of ships, it is expected that a larger proportion of Goodyear rubber will come directly to Los Angeles by sea. Officials point out, however, that shipping rates to other Pacific ports are lower than those prevailing to Los Angeles.

Rubber Show in San Francisco

The Rubber Association of America, Inc., is planning to send one of the most comprehensive exhibits of tire making ever assembled, to the Convention of Traffic Officers and the Safety First Exhibit that will be held in the San Francisco Municipal Auditorium in August. This promises to be one of the largest conventions ever held in San Francisco.

Lieutenant Dan Sylvester, head of the Traffic Squad at San Francisco and C. DeWitt DeMar, manager of the association, returned recently from an extensive Eastern trip and found that there is considerable sentiment throughout the country in favor of making this the greatest convention ever held for the discussion of traffic problems and for the framing of new uniform laws for traffic in all parts of the country. From every city in the country that the envoys visited letters were obtained indorsing the convention and promising to send delegations.

Outing of Mid-West Association

The first annual outing and summer meeting of the Mid-West Rubber Manufacturers Association will be held at the Hotel Breakers, Cedar Point, near Sandusky, Ohio, on Monday and Tuesday, August 16th and 17th. This decision was arrived at by the board of directors at the meeting held at the Chicago Athletic Association Tuesday, July 13, and the announcement at the general meeting of the association was received with enthusiasm.

The price of tickets has been fixed at $10.00. As this is the first general rubber trade outing ever held in the Middle West, where so large a number of the rubber manufacturing plants are located, it has been decided to make the invitation general to everyone in the trade whether members of this Association or not. The Association requests that all those desiring rooms at the Hotel Breakers should make their reservations direct at the earliest possible moment. It may be that some may wish to arrive on Saturday or Sunday, and as these are naturally the crowded days at a summer resort, the earlier reservations can be made for these days especially, the better.

Cedar Point boasts one of the most remarkable bathing beaches in the world and is in all ways one of the most charming points along the Great Lakes. There are immense hotels, extensive and beautiful groves and amusement parks.

It is but a fifteen-minute boat trip from Sandusky to Cedar Point, and boats run on regular schedule from Cleveland and Toledo. Cleveland boat leaves at 8:30 a. m. arrives at Cedar Point 11:45 a. m. Toledo boat leaves at 8:15 a. m. arrives at Cedar Point 1:15 p. m. and Toledo. A trip to historic Put-in Bay, the scene of Commodore Perry's victory on Lake Erie, which event is commemorated by the beautiful Perry Centennial Memorial, will doubtless attract many. The boat leaves Cedar Point at 11:45 a. m. arrives at Put-in Bay at 1 p. m. Returning leave Put-in Bay at 2:45 p. m. arrive Cedar Point at 4 p. m.

The following outing committee has been appointed by President Christie: H. S. Vorhis, chairman; E. T. Meyer-F. R. Henderson & Co., Chicago; Paul A. Bloom-Fred Stern & Co. Chicago; C. H. Taveniere-Charles E. Wood, Chicago; G. Matthias, Jr.-Mineral Point Zinc Co., Chicago.

Malay Rubber Output Increased

Vast new tracts of jungle suitable for the planting of rubber will be opened up along the Malay Peninsula by the new railroad that is now building, according to George L. Logan, United States Consul at Penang, Malay Peninsula, who is home on a brief leave of absence.

"The Malay Peninsula is the world's chief source of supply for rubber and tin and produces large quantities of copra, patchouli, and gums," said Consul Logan. "British and Chinese commercial interests predominate, although there has been a considerable increase in American investments and enterprise. There are approximately 50 American business houses in Singapore.

"A large part of the tin and rubber exported to the United States is entered at San Francisco and other Pacific ports for shipment East, which suggests the thought that manufacturers requiring such raw products ought to find the Pacific Coast a suitable location for their plants.

"There are today between two and three million acres in Malaya planted to rubber, and there will be a considerable increase in acreage during the current year. A market has developed for tractors and improved agricultural machinery suitable for such estates..

"A great deal of interest is being taken in the African oil palm which thrives very well in that soil and climate, and the British Government is encouraging its development. Another new industry giving promise of great success is the production of rubber seed oil used in the paint and soap trades.

"American food products have a large sale in Malaysia and are generally favored . There are over 3,000 miles of first class highways and a strong demand for American motor cars and accessories. The agent for a certain car told me he was over 2,000 cars behind on his orders.

"The number of cargo carrying vessels flying the American flag has greatly increased in those waters, and they are welcome visitors. One frequently hears the complaint that they are not operated on a sufficiently regular schedule, but more on a tramp basis, so that shippers do not always have ample time in which to assemble their shipments which may be miles from port and scattered on several estates when notice of the immediate arrival of a vessel is received."

Carroll Returns from Hawaii

Frank Carroll returned from a trip to the Hawaiian Islands about a month ago, and states that the tire situation in the Islands is a good deal like that of the cars in that the demand cannot be supplied. Mr. Carroll is district manager of the Goodyear Tire & Rubber Company, with headquarters in San Francisco. He was accompanied to the Islands by J. B. Winstanley of the automobile tire department, and J. R. McCormick of the mechanical goods department of the Goodyear Company. He stated that Goodyear business has greatly increased.

MARKETS

Manufactured Rubber Goods

NEW YORK, JULY 21, 1920

Much interest is being shown in the rubber manufacturing industry regarding the tendency of some of the larger rubber tire companies to spread out and extend the sphere of their activities. This tendency was manifested some time ago, when Goodyear decided to establish a plant in Los Angeles, where tires for the Pacific Coast trade are already being turned out. This manufacturer has been followed by several others, and the trade looks to Los Angeles to become the rubber center of the West.

Transportation problems are still occupying the attention of leaders in the industry. It is becoming increasingly difficult for the rubber goods makers to keep their plants running on schedule, delay after delay being encountered in the movement of raw materials to the factories and the outward movement of finished goods.

Although there is a good demand for the general line of rubber goods business is not as brisk as it might be were the money situation otherwise. With loans at a premium and difficult to get, buyers in all lines are operating on a more conservative basis than usual.

AUTOMOBILE TIRES

Prices are well maintained by leading tire manufacturers, and a good demand is reported on leading brands. Distribution is being interfered with seriously by the present freight congestion, and manufacturers are finding it a hard matter to get shipments through to buyers within any reasonable time limit. Buying at retail is picking up as the touring season gets under way. Although gasoline prices have risen considerably and promise to go still higher, no noticeable reduction in motoring is to be noted, and sales of automobiles have not fallen off, makers of the more popular lines of cars being still sold up far in advance. There is a persistent report that several automobile manufacturers are about to announce startling reductions in their prices. Should this report be true, a better demand for tires might be expected.

MECHANICAL GOODS

It would appear that the railroads are badly in need of rubber mechanical goods to repair their rolling stock which has been badly run down during the past few years. On a recent trip to St. Louis, our correspondent journeyed on one of the crack trains of a well known railroad. Just as the train was entering Harrisburg, the air brake hose between two of the cars broke, and the train was brought to a quick stop. Yardmen who repaired the break commented disgustedly on the condition of the rubber and declared that they were having "all kinds of trouble" from the same cause, as the result of the roads having allowed their equipment to run down. The manufacturers have been getting a few orders for hose, but the big buying movement which has been anticipated for so long has not yet set in. A better demand for marine specialities is reported, as many of the Shipping Board vessels are being reconditioned and sold. A steady routine market is reported for belting and packing.

BOOTS AND SHOES

New lines of rubber heels are appearing on the market from time to time, and demand seems to be sufficiently strong to absorb all of the heels produced. The larger manufacturers, with established brands, report that demand is keeping pace with production, while manufacturers of the many unadvertised lines also report business booming, and are extending their operations in many instances to take care of their increased business.

MISCELLANEOUS

With sugar supplies becoming more liberal, an increasing demand for rubber jar rings is reported, and the market is picking up somewhat. The high prices which commercially canned fruits are bringing are leading many housewives to put up their own fruits this year, even though home canning costs may be high.

Manufacturers of rubber novelties are doing a good business, demand for toy balloons and other similar novelties being strong. Many speciality manufacturers are using balloons for advertising purposes.

Cottons, Yarns and Fabrics

NEW YORK, JULY 21, 1920

During the past month the cotton markets have witnessed a very good recovery, particularly on the cotton exchanges where the price of futures contracts had been depressed steadily because of the very favorable June growing weather and the unfavorable trade advices coming from England as well as our own trade centers. However, weather conditions through the first three weeks of July were not unalloyed blessings inasmuch as the boll weevil made serious inroads in some sections and remains as a savage threat in the rest of the belt. At the same time the Manchester and Lancashire trade advices begin to show improvement. The apparent success of the monsoon is expected to bring India and other Far Eastern countries back in the market as large consumers and business abroad begins to look much better.

The New York futures market had been in a heavily oversold condition with a short interest far exceeding the long account. Naturally the first sign of changing conditions found the market only too ready to advance and the rise has been rapid and consistent. July options have sold at new high levels well above 42 cents with new crop positions closing up on the leader rapidly. Much of the available stock in the South at present is low grade and while the total number of bales on hand runs well into the millions it is confidently stated by trade leaders that there are not 300,000 bales of good high grade cotton in the country which explains the independence of the Southern spot markets from the cotton exchange prices.

EGYPTIAN COTTON

American Consul Lester Maynard, at Alexandria, writes; "A serious effort is being made by the newly created department of supplies which has replaced the supplies control board, to restrict the area under cotton cultivation with a view to increasing the crops of foodsuffs, and at the beginning of the year a law was enacted to punish farmers for uprooting food crops to prepare the land for cotton. The high price of cotton as compared with food crops has been a great temptation to the farmers, and the law was enacted too late to be effective. The increased acreage this year might be conservatively estimated for both Upper and Lower Egypt to bring the total under cultivation up to 1,800,000 acres."

ARIZONA-EGYPTIAN COTTON

With the purchase of another large tract of land in the Southwest by one of the leading tire companies prospects for a sharp increase in production next year are bright. In addition to expanding acreage in the Southwest, growers are also invading sections of lower California, and putting the land there under cultivation for long staple cotton.

SEA ISLAND COTTON

The market is strongly held at Savannah on the nominal basis of $1.15 per pound for No. 2 Sea Island, with average staple, and there is a good demand reported for current light offerings. Manufacturers of tire fabrics are not showing much interest in the Sea Island situation with the gradual elimination of this cotton as a factor in the market, and

have turned their interest to Egyptian and American-Egyptian cotton as a substitute, also using some Peruvian long staple.

TIRE FABRICS

While the market is still on a nominal basis, the consistent upward tendency is not so much in evidence. Offerings are not large, however, and most of the mills are tied up with contracts on which they are operating at the present time. As the result of this condition, there is little or no tire fabric offering in the open market.

DRILLS, SHEETINGS AND OSNABURGS

The market is in a weak position, in sympathy with the general downward trend of prices on cotton fabrics, and trading is very quiet. Mills in the New England producing district are doing but a small fraction of their usual business, most of the spot business being transacted by second hands. Manufacturers, however, are gradually reducing their prices as they find buyers persistent in holding off from the market.

HOSE AND BELTING FABRICS

More strength in this branch of the market is to be noted, due to the heavy demand spinners are experiencing. Belting is stronger at 80 and 82 cents per pound, and the market for hose ducks is stronger at the same price. Enameling has also shown another advance, and is being held firm at 95 cents per pound and up, according to width. Shoe ducks are nominally unchanged at 90 to 92 cents per pound. The range of quoted prices on single filling ducks has widened, the market being quoted at 34 to 40 cents per yard. Double filling is firm at 40 cents.

TIRE FABRICS

17¼-ounce Sea Island, combed, sq. yd.		Nominal	
17¼-ounce Egyptian, combed		2.35	@2.50
17¼-ounce Egyptian, carded		2.25	@2.40
17¼-ounce Peelers, carded		Nominal	
17¼-ounce Peelers, combed		2.25	@2.35

DUCKS

Belting (pound basis) lb.	.80	@	.82
Hose (pound basis)	.80	@	.82
*Enameling	.95	@	—
Shoe Ducks	.90	@	.92
Single filing yd.	.34	@	.40
Double filing	.40	@	—

*Price varies according to width.

DRILLS

37-inch 2.35-yard yd.	.30½	@	.31
37-inch 2.75-yard	.27	@	—
37-inch 3.00-yard	.26	@	—
37-inch 3.25-yard	.24	@	—
37-inch 3.50-yard	.23½	@	—
37-inch 3.95-yard	.19½	@	—
37-inch 2.00-yard Southern	Nominal		
37-inch 2.00-yard Northern	Nominal		
40-inch 2.40-yard Southern	Nominal		
40-inch 2.40-yard Northern	Nominal		
52-inch 1.90-yard Southern	Nominal		
52-inch 1.90-yard Northern	Nominal		

SHEETINGS

40-inch 2.35-yard yd.	—	@	—
40-inch 2.50-yard	.30	@	—
40-inch 2.85-yard	.28	@	—
40-inch 3.00-yard	—	@	—
40-inch 3.25-yard	.26½	@	—
40-inch 3.75-yard	.25	@	—
40-inch 3.60-yard	.27	@	.27½
40 inch 4.25-yard	.21	@	—

Note—In view of the unsettled conditions prevailing in the market at the present time, the prices quoted above are more or less nominal, and are not guaranteed.

BURLAPS
(Carload Lots)

	Cents	Per	Yard
7 -ounce 40-inch	——	@	——
7½-ounce 40-inch	9.90	@	——
7½-ounce 45-inch	——	@	——
8 -ounce 40-inch	8.15	@	——
8½-ounce 40-inch	10.75	@	——
10 -ounce 36-inch	10.75	@	——
10 -ounce 40-inch	10.75	@	——
10 -ounce 45-inch	Nominal		
10½-ounce 40-inch	11.00	@	——

Chemicals and Compounding Materials

NEW YORK, JULY 21, 1920

Transportation difficulties are still serving as a drawback to spot trading, and shortages in many lines are reported from time to time. Although these shortages are only temporary, they serve as causes for price increases in most instances, spot holders invariably demanding premiums over the open market prices for their goods. The car situation is showing some improvement, however, and producers who a short time ago had a surplus of merchandise which they were unable to ship, are now getting their shipments out in better time, resulting in less confusion at the mills and less trouble in consuming markets.

The market is steady on most lines, but price reductions are reported here and there, and the entire market is gradually coming in on the lower price movement. On some lines, however, notably pigments, no reductions may be looked for during the remainder of the year, as producers are booked up practically solid until the first of next year at prevailing prices.

IMPORTS AND EXPORTS

Export buying is not much of a factor in the present market for only the South and Central American countries are in evidence.

Imports are playing a more important role in the market, however. Some consignments of barytes and lithopone are coming in from Germany, and a few small lots of zinc oxide have been reported in. Italian and French talc is also to be had. British chalk is arriving in small quantities, with a good demand for practically all that can be had.

BENZOL AND OTHER CRUDES

Continued strength features the benzol market, producers being able to offer only in limited quantities. Prices are firm at 30 cents per gallon for the pure and 28 cents per gallon for the 90 per cent. A firm market is reported for phenol, with the market generally held at 12 cents per pound. Supplies of toluol continue light, and the market is held on a nominal basis, no sales of any consequence having been reported. Xylol is not offering in a large way and holds unchanged at 40 cents a gallon for pure and 35 cents for the commercial.

LITHARGE

Producers of litharge are still behind in their deliveries, and are centering their activities on the expediting of shipments to buyers. No price changes have been recorded during the period under review, producers holding the market firm on the basis of 11¾ to 12¼ cents per pound for American powdered in casks. Quantity prices continue unchanged.

LITHOPONE

Continued shipments of imported lithopone are reaching the market, but no large blocks have yet been reported, most of the imports being small lots going direct to consumers. The market is strongly maintained on the basis of 8 to 8¼ cents per pound, but producers are not looking around for any additional business, having booked up their production for the next few months. The production next year is expected to be increased by about 25,000 tons as the result of expansion this season.

WHITING

Imports of chalk continue light, and producers of whiting are unable to turn out sufficient quantities to fill consuming demand. Prices are firmly maintained by producers on the basis of $1.40 for commercial, $1.45 for gilders' bolted, $1.55 for extra gilders' bolted, $1.75 for American Paris white, and $2.00 for English cliffstone.

BARYTES

Stocks are not large, even though producers in the Western and Southern states are working to capacity whenever possible, and the market is consequently strong held at a minimum price of $23.50 per ton f. o. b. mills. Lithopone manufacturers are unable to obtain sufficient supplies of barytes even though their supplies of domestic are being augmented by shipments now coming in from Germany.

DRY COLORS

The edge has been taken off the demand for dry colors, dealers report, but this is attributed entirely to the slackening of demand from the paint trade, which is entering upon its dull season. Prices are not showing much of a downward tendency, however, being held firm in most instances. Producers are seizing upon the present lull in buying as a temporary respite from pressure for delivery, and are catching up with back business. The market is held firm as quoted.

INTERMEDIATES

Softness has developed in the market for intermediates, and an easier tendency is noted in various quarters of the market. Aniline oil is on a nominal basis, holding about 33 to 36½ cents per pound, with the tendency towards lower prices. Paraphenylenediamine is quiet and nominally unchanged at $2.70 per pound. Paranitraniline is quiet, and nominally unchanged at $1.35 per pound spot. Betanapthol is showing more strength than the other intermediates, and is not offering in the open market. Dimethylaniline continues unsettled and nominally held. Benzidine is easier at $1.30 per pound for base, and about $1.15 for sulphate. It is expected that prices on the general list will tend lower as production increases.

MISCELLANEOUS

Linseed oil is dull, and prices continue to show an easy undertone, the market tending downwards. Future business is light.

Vegetable oils are generally showing weakness, rapeseed oil being the main exception, the market holding steady on the basis of $1.60 to $1.65 per gallon for refined, with blown held at $1.75 per gallon.

Waxes are showing an easy undertone, despite the fact that replacement costs are above the spot prices. Bayberry and carnauba have been especially weak during the past fortnight.

Acetone, carlots	lb.	.21 @	.22
smaller lots	lb.	.22 @	.23
Acetanilid, C. P., bbls.	lb.	.75 @	.80
Acids, Acetic, 56 per ct.	cwt.	8.40 @	9.15
Carbolic, C. P.	lb.	.12 @	.20
Muriatic, 20 deg.	cwt.	2.25 @	2.50
Muriatic, 22 deg.	cwt.	3.00 @	3.25
Nitric, 42 deg.	cwt.	7.50 @	8.00
Nitric, 40 deg. cwt.		7.50 @	7.75
Sulphuric, 60 deg. car lots	tons	19.00 @	21.00
Sulphuric, 60 deg. car boys		19.00 @	21.00
Tartaric, crystals	lb.	.76½ @	.77
Aluminum, Silicate		Nominal	
Aniline oil, bulk basis, Contract		— @	—
Imported		Nominal	
Domestic		.33 @	.36½
Antimony—			
Oxide	lb.	.14 @	.15
Sulphuret, red	lb.	.22 @	.25
Sulphuret, golden	lb.	.29 @	.30
Sulphuret, crimson	lb.	.45 @	.50
Alcohol, denatured, 190 proof		1.08 @	1.12
Wood, 95 per cent.		3.25 @	3.30
Ethyl, 190 proof		Nominal	
Aldehyde Ammonia		Nominal	
Ammonia, powdered		.17 @	.17½
Ammonium Carbonate, domestic	lb.	.16 @	.16½
Amyl Acetate	gal.	4.70 @	4.80
Anthracene, 80 per cent.		1.00 @	1.10
Anthroquinine, 95 per ct.		4.00 @	4.25
Asbestine		Nominal	
Asphaltum, Egyptian	lb.	.20 @	.25
Domestic	ton	.30 @	.40
Barium, dust		— @	—
Sulphide	lb.	.07¼ @	.07½
Barytes, prime white imported	ton	Nominal	
white, domestic	ton	Nominal	
off-color, domestic	lb.	Nominal	
Southern, f. o. b. mills		23.50 @	25.00
Western, f.o.b. mills		23.50 @	25.00
Beeswax		.28 @	.65
Benzidine Base	lb.	1.30 @	1.35
Benzol, 90 per ct.	gal.	.28 @	.30
Benzol, pure bulk, 100		.30 @	.35
Blanc Fixe, dry, bbls.	lb.	.06 @	—
Burgundy Pitch, dom.	lb.	.08 @	.10
Foreign		.60 @	.65
Blacks, Drop	lb.	.05½ @	.15
Ivory	lb.	.16 @	.30
Carbon, gas, cases	lb.	.15 @	.30
Lampblack R M	lb.	.15 @	.45
Mineral blacks	ton	35.00 @	45.00
Blues, Prussian		.98 @	1.00
Soluble	lb.	1.05 @	1.10
Ultramarine	lb.	.15 @	.50
Browns, Umber, Turkey, burnt powdered	lb.	.05½ @	.07
American, burnt	lb.	.04½ @	.06
Cadmium, sulphide, yellow	lb.	1.50 @	1.65
Carbon Disulphide, bulk	lb.	— @	—
Bisulphide	lb.	.07½ @	.08
Casein, C. P.	lb.	.35 @	.36
Castor Oil		.19 @	.20
Caustic Soda, 76 per ct.	cwt.	6.45 @	6.65
Chalk, precipitated, extra light	lb.	.05½ @	.06
heavy	lb.	.04½ @	.05
China clay, domestic	ton	9.00 @	20.00
imported	ton	19.00 @	24.00
China Wood Oil, bbls.	lb.	.22 @	—
F.o.b. Pacific Coast		.18½ @	—
Chloroform, U. S. P.		.40 @	.45
Coal Tar Pitch		— @	—
Cottonseed Oil, crude f.o.b. mills	lb.	15.25 @	15.50
Prime summer yellow	bbls.	18.50 @	—
Dimethylaniline	lb.	1.30 @	1.45
Elateron		— @	—
Formaldehyde, spot	lb.	.50 @	.53
Fullers Earth, powd., 100 lbs.		1.50 @	2.00
Fossil flour	lb.	.03¾ @	.05
Genasco Mineral Rubber		— @	—
Gilsonite	ton	55.00 @	65.00
Glue, extra white	lb.	.35 @	.45
medium	lb.	.30 @	.35
low grade		.22 @	.26
foot stock		.19 @	.22
brown foots		.19 @	.22
common bone		.18 @	.21
Glycerine, C. P. (drums)	lb.	.28 @	.28½
cans		.29 @	.30
Graphite, flake (bbl.)	lb.	.14 @	.20
powdered (bbl.)	lb.	.05 @	.10
Green, chrome, R. M.	lb.	.42 @	.70
Ground glass (fine)	lb.	.03½ @	.04
Hexamethylene	lb.	Nominal	
Infusorial earth, powd'd.	lb.	.02 @	.035
bolted	lb.	.035 @	—
Iron oxide, red, reduced grades	lb.	.13 @	.15
red, pure, bright	lb.	— @	—
Hexamethyenetetramine	lb.	Nominal	
Kaolin		— @	—
Lime, hydrated		— @	—
Lead, red, dry (casks)	lb.	.12¼ @	.12½
sublimed	lb.	— @	—
white, basic carb.	lb.	.10½ @	.11
white, basic sulp.	lb.	.10 @	.10¼
Lime flour	lb.	.01¾ @	.02
Litharge (casks)	lb.	.11¾ @	.12¼
English	lb.	— @	—
Lithopone, domestic, bbls.	lbs	.08 @	.08¼
in bags	lb.	.07¾ @	—
M. R. X.		— @	—
Magnesia, carbonate	lb.	.17 @	.21
calcined light	lb.	.60 @	.65
Magnesite, calcined, pwd.	ton	50.00 @	65.00
Magnesia Oxide, heavy		— @	—
Light		— @	—
Extra light		— @	—
Napthalene	lb.	.19 @	.21
Nirobenzol		.14½ @	.16
Naphtha, motor gasoline, (steel bbls.)	gal.	.28½ @	—
68 @ 70 degrees (steel bbls.)	gal.	.35½ @	—
70 @ 72 degrees (steel bbls.)	gal.	.36½ @	—
73 @ 76 degrees (steel bbls.)	gal.	.38½ @	—
machine (steel bbls.)	gal.	.47½ @	—
Oil corn, crude factory	cwt.	16.06 @	—
corn, ref. bbls.	cwt.	20.56 @	—
linseed, (bbls.)		1.63 @	—
In carloads, spot		1.60 @	—
tank cars		1.53 @	—
Oil palm, Lagos	lb.	.11 @	.11½
Niger		.10½ @	.10¾
pine, yellow	gal.	1.00 @	—
distilled	gal.	1.25 @	1.35
rapseed, refined	gal.	1.60 @	1.65
rapseed, blown	gal.	1.75 @	—
rosin first rectified,	gal.	.71 @	—
second run		.74 @	—
tar (commercial)	gal.	.38 @	.40
Oleum Acid, 20 per ct.	ton	29.00 @	35.00
Orange mineral, Amer.	lb.	.15½ @	.16½
imported	lb.	Nominal	
Ozokerite		.35 @	.36
Paraphenylenediamine	lb.	2.70 @	2.85
Petrolatum, bbls., amber	lb.	.06 @	.07
pale yellow	lb.	.06½ @	.07
Paranitrosodimethylanaline		3.50 @	4.00
Parafin, refined, 118 @ 120 m. p.		.12 @	—
127 @ 129 m. p.		.11 @	—
137 @ 140 m. p.		.12½ @	—
Phenol		.12 @	.25
Pumis		.05 @	.10
Pine tar kiln	bbl.	14.50 @	—
Pitch	bbl.	8.50 @	—
Plaster of paris	bbl.	4.25 @	5.00
Red Tuscan	lb.	.22 @	.30
red (American)	lb.	.14 @	.16
Indian (English)	lb.	.14 @	.16
Standard	lb.	— @	—
Rosin (common to good)— 280 lbs.		13.50 @	—
Rotten stone, powdered	lb.	.02½ @	.04½
Rubber, substitute, black	lb.	.13 @	.17
white	lb.	.15 @	.24
brown	lb.	.20 @	.25
Rosin Oil, first rectified		.71 @	—
Second rectified		.74 @	—
Third rectified		.91 @	—
Fourth rectified		.95 @	—
Soda ash, light, 58 pct.	cwt.	3.35 @	3.50
Sodium Nitrite	lb.	.24 @	—
Solvent Naptha, crude, hvy.		.25 @	.32
Soya Bean Oil, bbls.	lb.	.16½ @	.17
Sellers, tanks, f. o. b. Coast		.11 @	—
Stearic Acid, single		.22¾ @	—
Shellac, fine orange	lb.	Nominal	
Sulphur Chloride, drums		.06½ @	.16
T. N.	lb.	1.10 @	1.15
Bleached ordinary	lb.	1.05 @	1.10
Bleached, bonedry	lb.	1.20 @	1.30
Silex (silicia)	ton	25.00 @	40.00
Soapstone, powdered	ton	15.00 @	20.00
Starch, corn, powd.	cwt.	5.62 @	—
pearl		5.47 @	—
Jap potato, duty pd,	lb.	.05 @	.05½
Sulphur, crude	ton	— @	—
100 pounds		— @	—
roll		3.20 @	—
commercial superfine		2.00 @	2.25
Talc, American	ton	18.00 @	20.00
French	ton	30.00 @	—
Thiocarbanilid		— @	—
Toluol, pure, in drums	gal.	.31 @	.35
commercial		.30 @	.32
Tripolite earth	lb.	.01½ @	—
Turpentine, pure gum— spirit	gal.	1.80 @	—
wood	gal.	— @	—
Venice, artificial	gal.	.15 @	.16
true		Nominal	
Vermilion, English	lb.	1.70 @	1.75
American		.25 @	.30
Vorite		Nominal	
Wax, beeswax, crude yel.	lb.	.24 @	.26
refined		.32 @	.35
Bayberry		.37 @	.39
ceresin, white	lb.	.15 @	.16
yellow		.14 @	.15
Whiting, commercial	cwt.	1.40 @	—
Gilders Bolted		1.55 @	—
Paris white, Amer.	cwt.	1.75 @	—
English cliffstone	cwt.	2.00 @	—
Xylol (gal.) pure		.40 @	.45
Commercial		.35 @	.40
Zinc Oxide, French process, red seal		.11½ @	.11¾
green seal		.12¼ @	.12¾
white seal		.18½ @	.18¾
Leaded Grades— Commercial, lead free		.09½ @	.10
5 per ct. lead sulphate		.09 @	.09¼
10 per ct. lead sulphate		.08¾ @	.09¼
20 per ct. lead sulphate		.08½ @	.09
35 per ct. lead sulphate		.08¼ @	.09¼
Zinc sulphate		.03½ @	.04¼

Crude Rubber

July 21, 1920.

Crude rubber prices have been consistently weak and offerings on the market during the past few days have been increased because of the uncertainty regarding the financial position of one large interest. Demand is quiet and there is a growing willingness on the part of some holders to dispose of their holdings even at the expense of values and about the only demand that seems to be in evidence is the result of bargain hunting. The latest cables from primary points are rather discouraging as the market continues in a weak position in both London and Singapore.

Para—Up-river fine		.34½ @	.35
Up-river medium		.31½ @	.32
Up-river coarse		.24 @	24½
Caucho ball		.25½ @	.26
Islands fine		.35 @	.35½
Islands coarse		.17½ @	—
Cameta		.20 @	.21
Ceylon—Smoked sheets, ribbed		.31½ @	.32
Smoked sheets, plain		.30 @	.31
Maderia, fine		.37 @	.39
Knapsack		.45 @	—
First latex pale crepe		.32½ @	.33
Amber crepe		.33 @	.34
Clean brown crepe		— @	—
Rio Nunez string		— @	—
Palembang		.13 @	.13½
African		— @	—
Prime Surinam sheets		.84 @	—
Centrals—Corinto prime		.22 @	.23
Esmeralda, prime		.22 @	.22½
*Balata sheets		— @	—
Guayule, wet		.26 @	.27
Balata, block, Panama		.45 @	—

* Nominal

Scrap Rubber

New York, July 21, 1920.

No further developments of interest have been recorded in the market for scrap rubber, and trading has been dull and of little moment since the first of the month. Prices have been quoted lower in various quarters of the market, but price slashing thus far has not improved business to any appreciable extent, and most dealers are holding off the market until late in the fall, when the reclaiming trade is expected to make some heavy purchases, unless the market for crude rubber should remain at its present low level.

Further price declines have taken place, as follows: boots and shoes down 6.75 @ 6.87½ cents per pound, trimmed arctics 5.75 to 5.87½, other grading lower in proportion. No important receipts of air brake hose have been recorded for some time, and there is no open market price quoted on this variety. The trade is looking for some heavy supplies of this hose, however, when the railroads get down to overhauling their rolling stock.

Boots and shoes	6.75 @	6.87½	
Arctics, trimmed	5.75 @	5.87½	
Arctics, untrimmed	4.75 @	5.00	
Tires—Automobile	2.62½ @	2.75	
Bicycles, pneumatic	1.75 @	1.87½	
Mixed hose	1.25 @	1.37½	
Air brake	— @	—	
Inner tubes, No. 1	12.75 @	13.25	
Inner tubes, No. 2	7.87½ @	8.00	
Red tubes	6.62½ @	6.87½	

Rubber Imports for June

Figures compiled by the Rubber Association of America, Inc., show a considerable decrease in the imports of rubber as compared to the imports for May. Importations of plantation rubber for June are practically one-half of the amount brought into the country during the preceeding month. A considerable falling off is noticeable in the importations of Africans, Centrals and Guayule and Paras. Importations for June, 1920, total 14,881 tons as against 16,319 tons for June, 1919, but this is offset by the fact that total importations for the six months ending June 30, 1920, amount to 151,889 tons as compared to 113,729 tons for a like period during 1919.

Following are the detailed statistics of the Rubber Asociation:

PLANTATIONS

From	Tons
Liverpool	73
Rotterdam	368
London	2,158
Genoa	18
Singapore	4,573
Rangoon	9
Colombo	2,797
Deli-Belawan	465
Batavia	414
Sourabaya	249
Pt. Swettenham	796
Tandjong Priok	118
Penang	408
Japan and others	465
	12,911

AFRICANS

From	Tons
Marseilles	129
Antwerp	7
Bordeaux	72
Rouen	6
Havre	46
Lisbon	167
	427

CENTRALS AND GUAYULE

Centrals (Mexico and Central America)	27
Guayule, Eagle Pass, by rail	80
Laredo, by rail	84
	191

PARAS

Manaos	240
Para	949
Montevideo	11
Iquitos	152
	1,352

GUMS, WASTE RUBBER, ETC., IMPORTED FROM VARIOUS SOURCES

Waste	166
Balata	7
Miscellaneous Gums	552

COMPARISON 1919-1920

	Total Importations June— 1919	June— 1920	6 months ending, June 30th 1919	Total 1920
Plantations	13,645	12,911	95,844	134,403
Paras	1,706	1,352	13,922	12,809
Africans	264	427	1,571	3,610
Central	263	27	929	550
Guayule	390	164	1,300	504
Manicoba and Matto Grosso	51	—	163	13
	16,319	14,881	113,729	151,889

ARRIVALS PLANTATIONS FOR JUNE, 1920, SHOWING PORTS OF ORIGIN AND ARRIVAL

From	Arrived at	Tons
Singapore	New York	3,860
Tandjong Priok	New York	118
Deli-Belawan	New York	465
Genoa	New York	18
Rangoon	New York	9
Port Swettenham	New York	796
Penang	New York	268
London	New York	2,158
Batavia	New York	414
Liverpool	New York	73
Sourabaya	New York	249
Rotterdam	New York	368
Colombo	New York	2,797
Singapore	San Francisco	182
Penang	San Francisco	140
Japan and others	San Francisco	262
Singapore	Seattle	350
Japan and others	Seattle	203
Singapore	Vancouver	181
		12,911

ARRIVALS OF PLANTATIONS BY PORT

Atlantic Ports		
New York		11,593
Pacific Ports		
San Francisco	584	
Seattle	553	
Vancouver	181	
		1,318
		12,911

Exports of Rubber for May

Statistics issued recently by the Bureau of Foreign and Domestic Commerce of the Department of Commerce, Washington, D. C., show that exports of rubber manufactures and insulated wire cables from the United States during the month of May totalled $9,019,587. This is a decided increase over the figures for April when goods totalling $6,754,889 were exported. Neither of these summaries include exports to Porto Rico or Hawaii.

The value of the articles exported, not including exports to Porto Rico and Hawaii, were as follows: Belting, $256,076; hose, $297,255; packing, $150,001; boots, $74,597; shoes, $659,581; druggist's rubber sundries, $284,981; soles and heels, $89,578; automobile tire casings, $4,630,072; inner tubes, $512,132; solid tires, $404,316; all other tires, $63,659; all other manufactures of rubber, $806,036; insulated wire and cables, $791,303. Exports to Porto Rico and Hawaii were as follows: belting, hose and packing, $28,992; automobile tires, $181,829; all other tires, $24,025; all other manufactures of rubber, $40,168.

Export Field of the Hawaiian Islands

When F. C. Milhoff, general sales manager of the Miller Rubber Company of Akron, was visitng San Francisco in May, while on a tour of the Western Territory, he made the following statement in commenting on the export trade:

"Perhaps the greatest and safest American export market is now developing at the crossroads (meaning the Hawaiian Islands) of the Pacific. While fluctuating exchange and unsettled conditions in Europe and also in Asia and Africa are greatly stifling the enthusiasm of the wideawake American exporter and explorer of foreign markets, the wonderful opportunities offering themselves in the Pacific are easily within our grasp, with the safety afforded by the Stars and Stripes and by the American dollar.

"In the tire business, Honolulu and the Hawaiian Islands are offering a rich, discriminating, year round market. According to the Miller agents in Honolulu, the Pond Company, Ltd., no more ideal market for cars could be selected than Hawaii. The weather conditions, for year round use, are perfect. During 1919 there were no more than a dozen rainy days. Even the temperature could not be improved upon—82.7 degrees being recorded as the highest and 66.3 degrees as the lowest for the year. The islands are quite out of the path of typhoons and hurricanes, which fact adds to the desirability of the climate from the standpoint of recreation and pleasure."

Growth of the Rubber Industry

The following article commenting upon the growth of the rubber industry appeared in a recent issue of the Wall Street Journal:

Total sales of rubber tires in the United States this year will exceed $1,000,000,000. In 1916 they were less than $500,000,000. In the current year approximately 40,000,000 tires will be produced, compared with 18,500,000 in 1916. In addition, millions of dollars' worth of rubber footwear, clothing and mechanical goods will be turned out.

Following tabulation of four leading rubber companies shows net profits after taxes, per share on common, dividends paid on common and net sales for 1919 and 1916 and estimates for 1920:

United States Rubber Co. is the largest producer of rubber footwear in the world. It ranks second in the production of tires. The large demand for rubber footwear which will accrue this Fall when dealers replace stocks depleted by last Winter's severe weather, and the steadily increasing output of tires resulting from the operation of new plants now nearing completion should bring sales this year close to $300,000,000, a $750,000,000 increase over last year and 2½ times busines in 1916. After almost four years of no dividends on the common, disbursements at the annual rate of $8 a share were resumed last October. As a further reward to junior shareholders a stock dividend of 12½ per cent was declared in January. It is not unlikely that another stock distribution will be made before the end of this year.

Goodyear Tire & Rubber Co. expects to earn $30,000,000 before Federal taxes this year. This would be equivalent to about $42 a share on 618,900 shares of common stock which will be outstanding upon conclusion of present financing and payment of the 150 per cent stock dividend declared last month. The company has been paying common dividends at the annual rate of $12 a share in cash since 1909. In the same period 450 per cent in stock dividends has been distributed.

B. F. Goodrich Co. will do a business this year approximately three times greater than in 1916 and net profits before Federal taxes, estimated to reach $18,000,000, will be almost double 1916 net earnings of $9,568,764. Although the company was obliged to do some financing recently, issuing $30,000,000 five-year 7 per cent notes, the common stock was placed on a $6 a share annual dividend basis in January, compared with previous rate of $4 a share.

Kelly-Springfield Tire Co. has not shown an increase in earnings in the same proportion with the other companies for the reason that its manufacturing capacity has not been expanded. It has under construction a new plant at Cumberland, Md., which will have a capacity greater than all of its existing plants. The new factory will not be completed before the end of this year but Kelly-Springfield should show the results of this development in 1921.